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TENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

TOGETHER WITH

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES.

WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

FINANCES OF THE COUNTY SOCIETIES,

FOR

1862.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1863.

TENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

In the early part of the last year the lung disease among cattle, commonly known as pleuro-pneumonia again made its appearance in this State, notwithstanding the efforts which had been made to eradicate it. Those who knew most of the history and nature of this lung disease were fully satisfied of the danger to be apprehended from it, and exerted an influence to have another Commission appointed to examine the facts, and, if necessary, to take measures to prevent the spread of the contagion.

A new Board of Commissioners was accordingly appointed in pursuance of an Act of the legislature, and though a part of its members are understood to have entered on their duties with a strong conviction that there had been needless alarm, and that the policy of the Commonwealth in regard to the disease, as carried out by the original Board of Commissioners, had been erroneous, and resulted in unnecessary expense, a careful examination soon satisfied them that the danger had not been exaggerated, and that strenuous efforts were required to meet it and arrest its progress.

Through the exertions of the Commission it is hoped the worst is now over, but good policy may still dictate that the same Commission, or some other, be continued for the purpose of guarding against a re-appearance of this fatal disease. A standing commission, ready to act in case of emergency, would have far less to do than one appointed to act in the premises after the facts became known. The formalities of legislation necessarily require much time, and the disease spreads rapidly before there is any power to act for its suppression.

Could the original commissioners have been appointed and begun to act as soon as the existence and nature of the disease became known, no doubt the ultimate expense would have been far less, and the result more satisfactory.

The Act under which the present Board of Commissioners was created, provided that the report to be by them submitted to the legislature, should appear in the Report of the Secretary of the State Board of Agriculture. It is as follows:—

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

By an Act of your honorable bodies, approved February, 1862, the present commission on contagious diseases of cattle was established.

On the 25th of the same month the following named persons were appointed by the governor and council to constitute the board of commissioners, viz.: E. F. Thayer, of Newton, H. L. Sabin, of Williamstown, and James Ritchie, of Roxbury.

Two of these persons were without experience in regard to the subject matter committed to their charge and inclined to receive with great caution the evidence of the existence in this country of a contagious lung disease among cattle. The State had already expended large sums of money, and great losses had been incurred by individuals, for the purpose of purging our cattle herds of the disease termed pleuro-pneumonia. In the community there was a divided sentiment in regard to the policy pursued by the previous board of commissioners in relation to this matter. Many ridiculed the whole proceedings and some of the members of your honorable bodies were much inclined to doubt the expediency of establishing a new board of commissioners with such vast powers as were conferred by the Acts of April and June, 1860. In view of these facts it was decided by the commissioners, at the outset, to take nothing for granted but to commence *de novo* and proceed with care and discrimination in the examination of all cases which might be presented for consideration.

A representation had been made in print by a committee of the State Board of Agriculture, about the middle of February, to the effect that the disease called pleuro-pneumonia had made its appearance in the county of Norfolk, and on the 1st of March a communication was received from the selectmen of the town of Milton, calling upon the commissioners to visit the herd of William A. Houghton, of that town. On the first day of January, 1862, this herd consisted of eight cows and two Jersey heifers. The first sickness in a cow of this stock was noticed about the middle of the same month. This animal had been in Mr. Houghton's possession four years. She was kept with the other stock until the 8th of February and was then transferred to the barn of Mr. Isaac Houghton in Dorchester, where no other cattle were kept. This cow continued sick, becoming very much emaciated, and on the 10th of March was killed by order of the commissioners. On examination both lungs were found badly diseased, the right lung contained a hard lump weighing about four pounds firmly encased. On cutting open the covering a quantity of very offensive matter appeared surrounding a piece of solidified lung in which the cells were distended and the usually very thin membranous tissue was thickened to a quarter of an inch. The left lung exhibited similar developments, with the exception that the cyst was smaller. Mr. Hatfield, the butcher, declared that among all the cattle he had killed, some of which had been variously diseased, he had never seen any thing resembling what was presented in this case. A portion of the lungs of this animal was taken to the State House and exhibited to the governor and council and to many members of the legislature. On inquiry of Mr. William A. Houghton it was ascertained that another of his stock was sold in January, in poor condition, to a German butcher engaged in the manufacture of Bologna sausages. Still another died in February, before notice was given to the selectmen. This notice was served on the 13th of that month, and on the following day the authorities took formal possession of the herd and had one of the cows killed, which was found to be diseased in her lungs in manner answering to the usual description of the malady termed pleuro-pneumonia. On the first visit of the commissioners, March 1st, a cow that had taken neither food nor drink for six days was killed. On examination the right lung was found wholly diseased. The exudation had been excessive and the lung was firmly adherent to ribs and diaphragm. The left lung was in the main without disease although exhibiting evident marks of having been overworked.

An examination into the origin of the disease in William A. Houghton's herd, and into that of another herd similarly infected in the town of Quincy, a full account of which will be found in a subsequent part of this report, induced the commissioners, in view of the experience of other years and as a measure of proper precaution, to act on the presumption that the disease was infectious. They accordingly ordered the entire isolation of all herds of cattle which, by any possibility, might have had any contact with one of the animals supposed to have been infected, and prohibited the buying or selling of cattle by the owners of such herds.

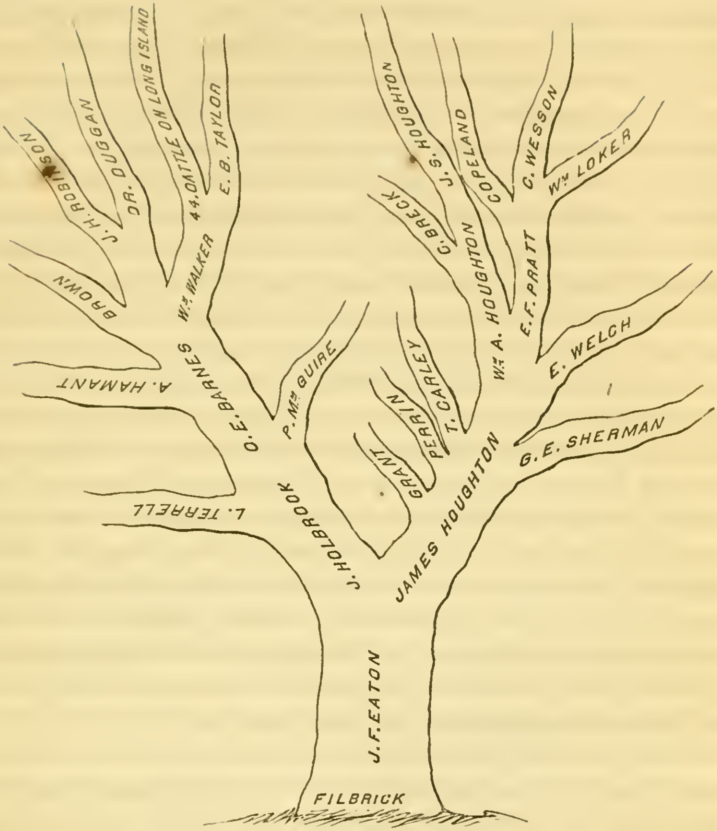
On the 11th of March, the commissioners submitted a partial report to the House of Representatives, in response to a resolution of that branch of the government, in which the hope was expressed that the disease would be very limited in extent. Subsequently, however, cases were multiplied; and for some time it was feared that the infection might have reached every portion of the Commonwealth. The commissioners were summoned in various directions, but in the main, ascertained that these requests were caused by cases which on examination presented no appearances like those developed in the examinations in Milton and Quincy. In one instance, in the town of Rutland, an ox died very suddenly. His yoke-fellow was sold to a neighboring farmer, and the ox to which this had been mated was taken sick and subsequently died. The lungs in these cases were examined. One was without disease in those organs, and the other presented a case of severe bronchial inflammation. In fact, in all the cases presented where no contact could be even inferred, not the slightest indication, like those of the disease termed pleuro-pneumonia, was exhibited.

About the first of April, from inquiries made at Brighton and Cambridge, it became known to the commissioners that a disease of a peculiar nature had appeared in the herd of E. Welch, a milkman in South Boston. On examination, it was ascertained that a cow which had been exposed in Dorchester, had been purchased and introduced into his herd about the 9th of January, and that several of his cows had been taken sick. Accordingly his herd was isolated, but as in this and other instances, it appeared to the commissioners that, in such situations, the isolation could not be perfectly secured, arrangements were made for the removal of the infected herds to some secure place, where the public would not be endangered, and where experimental knowledge might more readily be acquired as to the nature and progress of the disease. Accordingly the commissioners took possession of a farm at Squantum, which was under lease to one O. C. Barnes, the owner of an infected herd, and all the herds which were then known to be infected, were removed thither in the night time. The buildings to which the cattle were removed were old and fully ventilated in every direction, but the disease soon took hold of the healthy animals, and when killed very few were found to have escaped the infection. A sick cow was purposely tied between two apparently perfectly healthy. These in the course of a few weeks became sick, while the cow in the middle became apparently better, but when killed was found badly diseased, the unhealthy portion of the lungs having become encased with a firm membranous covering.

Many members of the last legislature visited Squantum, and were present when cattle were killed. They were all satisfied as to the peculiar character of the disease; and those who doubted when they went, returned convinced. In fact, there remained no longer room to doubt the infectious nature of the disease. Many animals fully exposed entirely escaped. Well fed milch cows rarely failed to take the disease. Bulls, oxen, heifers and poor cows were more commonly among the exempts. It does not appear that the disease is so infectious as the small-pox among human beings. It is, however, sufficiently so to be very alarming. As an approximation, it may be stated that twenty-five per cent. of an infected herd will die, fifty per cent. may recover so as in a measure to be healthy, but when killed will be found to have a portion of diseased lung fully encased, and separated from the healthy portions, and twenty-five per cent. will come out in perfect condition.

One hundred and fifty-four cattle have died or been killed during the past ten months under suspicion of having been infected. Of these forty-four were cattle pastured on Long Island, killed for reasons hereinafter to be given. Of the remaining one hundred and ten seventy-seven were diseased and thirty-three perfectly healthy. Contact was proved in all but one instance which may be thus given.

Mr. William Walker, of Quincy, was at Squantum when diseased cattle were killed there. He examined closely portions of diseased lung and walked through the blood of the slain animals. He then rode home a mile and a half and went to the barn and fed his cattle. These became diseased. Two were sold to E. B. Taylor and all but three out of his herd of twenty-one were found diseased. Another was sent to Long Island where forty-four cattle belonging to individuals in different towns were pastured. This cow was taken sick and when killed was found to be diseased with this peculiar form of disease. This affair caused great perplexity to the commissioners. The cattle on the Island had all been exposed and yet they appeared perfectly healthy. It was decided to keep them on the Island until it was necessary to dispose of them for want of shelter. The owners were consulted and either they or their neighbors objected to their removal from the Island. Intelligent stock owners in various parts of the Commonwealth remonstrated against endangering the whole cattle of the State for the sake of the comparatively insignificant sum of eight or nine hundred dollars. Accordingly the cattle were killed on the last week of November and all found perfectly healthy. Had it not been done the community would have been full of apprehension. The law in relation to the disposal of exposed cattle found perfectly healthy was so worded that an insignificant amount was realized from the sale thereof. Without going further into detail upon the progress of the disease, the accompanying diagram is submitted, exhibiting its course during the past year.


J. H. ROBINSON
DR. DUGGAN
44 CATTLE ON LONG ISLAND
E. B. TAYLOR
BROWN
Wm WALKER
A. HAMANT
O. E. BARNES
P. McGUIRE
L. TERRELL
J. HOLBROOK
J. S. HOUGHTON
C. BRECK
COPELAND
C. WESSON
Wm LOKER
E. F. PRATT
Wm A. HOUGHTON
T. CARLEY
PERRIN
GRANT
E. WELCH
G. E. SHERMAN
JAMES HOUGHTON
J. F. EATON
FILBRICK

The following concise statement will sufficiently explain the diagram and exhibit the main features in the progress of the disease in this State during the past year.

In March, 1861, Mr. J. F. Eaton purchased a yoke of cattle of a person at Brighton who had the same day bought them of a driver from North Hampton, N. H., named Jonathan Philbrick. A gentleman in search of a pair of oxen had previously declined to take these on account of their unhealthy appearance. Soon after Mr. Eaton had put these cattle to work on his farm one became sick, then the other, then a bull stalled next to the oxen. All of these died of a loathsome disease. Very soon his cows, one after another, were attacked. Several died and some were killed to put them out of misery. Those that apparently recovered were afterwards found to have the disease encysted or covered over for a time. In August Mr. Eaton sold eight cows to Mr. John Holbrook, of Randolph, two of them at the low price of five dollars each. Finding it difficult to get these two home Mr. H. bargained with an Irishman to take two weary cattle on the road for the sum of ten dollars. The cash not being on hand, the verbal promise to pay was taken, but as one cow was nearly dead when the purchaser found her and as the other died shortly after the purchase, only fifty cents were realized out of this shrewd bargain. The other six cows, after remaining a few days in a field with a cow and calf previously belonging to Mr. Holbrook, were sold to Mr. Loring Tirrell, of Weymouth, for a sum less than that paid Eaton by Holbrook for them. Before reaching home Mr. Tirrell found that two of the cows were sick, and on his arrival he tied the two up in a barn with a cow he had kept for about a year to supply his family with milk. The three were afterwards turned out to pasture together where they all died. Three of the remainder were killed for beef and the remaining one was sold. The latter was traced out, bought and killed and found not diseased. This ended,—through the mere circumstance that this cow sold had not become infected,—the progress of the disease in that direction.

The cow which Mr. Holbrook had at the time the six before mentioned were in his pasture and which was never suspected until killed of being diseased, was sold to O. C. Barnes, of Squantum, who at that time had a milk herd of thirteen cows. Three of these were soon after sold for beef. In November one of his cows was taken sick and died. About the first of December another was taken away by Philbrook, the butcher, who saw the lungs of the one that died. Mr. Philbrook had at that time in his barn thirty or more milch cows. The cow from Barnes', while on its way to the slaughter-house, accidentally went into the barn among these cows. When killed the lungs of this cow were found so diseased that the carcass was sent to Ward's factory. In a short time thereafter several of Mr. Philbrook's cows became sick. He killed nearly all of them and such as were healthy went for beef. Eight, however, of the carcasses could not be used and were sent to Ward's. Seven of O. C. Barnes' herd proved to be diseased. From this point the disease was carried in the various directions indicated in the diagram and was only stopped by the destruction of ninety-three head of cattle at an expense of $3,000 to the State and a loss of as much more to individuals.

In June, 1861, Mr. J. F. Eaton, the same whose cattle trade involved the history just recited, purchased another pair of oxen and took them to his farm where he kept them as far as possible from the rest of his herd and from contact with his sick cows. After using them to get in his hay he sold them in August to James Houghton, of Dorchester. In October one of Mr. Houghton's cows was taken sick, and one day on driving her out to take the air she fell dead. Several others were taken sick from time to time. One cow was driven from his place early in December to his brother's, William A. Houghton, of Milton. There she remained three weeks. In about two months Mr. William A. Houghton's herd became sick, several died and the rest were killed January 9. Mr. James Houghton sold a cow to E. Welch, of South Boston. In about a month she was taken sick and in the following April Mr. Welch's whole herd perished and nine out of the fourteen were found diseased with the peculiar lung disease called pleuro-pneumonia. In January Mr. Houghton sent the oxen and some cows to Brighton, but not getting the price he desired he transferred them to his farm in Grafton. On the 19th of March two of the cows at Grafton were found sick in the acute stages of the disease and one other in which the disease had evidently existed for months.

The nine cattle at this place were slaughtered on the same day, and among the rest the yoke of oxen sold by J. F. Eaton to James Houghton. One of these oxen was found to have no sign of disease in the lungs, and the other had only a small cyst not larger than a hen's egg, and was never previously suspected of being other than perfectly healthy.

It will be seen from the foregoing, that two animals, the Holbrook cow sold to Barnes, and the Eaton ox sold to James Houghton, neither of which were even suspected of being diseased, have brought thousands of dollars' expense upon the community and much loss and suffering to individuals, who in some instances have lost valuable milk routes, and in others the very means of procuring present subsistence. In view of these facts, the commissioners suggest whether there is any safety in allowing any cattle to live that have ever been exposed to this disease. For the encouragement of those interested in neat stock, the commissioners take pleasure in placing upon record the example of a large owner of cattle immediately adjoining the estate of Mr. J. F. Eaton. After Mr. Eaton's oxen had died, this neighbor said to him: "If your bull standing next to the oxen is taken sick, I shall believe it is the pleuro;" and after the bull died, and even before, he took great precaution in regard to his cattle—employing a boy constantly while the cattle were in pasture to keep them from contact with Mr. Eaton's. He would not allow any of his neighbor's cattle to come into his yard, and as the result of his vigilance, he secured the entire exemption of his herd from the disease which had utterly swept off Mr. Eaton's herd of at least twenty-four cattle.

In view of the foregoing statements, it does not appear to the commissioners worth their while, or of any advantage to the community, to enter upon an elaborate argument against the medical theory that lung diseases are not contagious, or against the physical theory that this disease is generated from local causes. They rely wholly upon the facts of its actual propagation.

It having been urged that in Brooklyn, N. Y., and Bordentown, N. J., the same disease existed, and that its origin could not be traced, the commissioners deemed the subject of sufficient importance to warrant them in making a personal examination of its developments in those places. They visited Brooklyn, and examined the famous stables in Skillman Street and elsewhere, and ascertained that the disease took off annually thirty per cent. of the cattle; that inoculation had been tried without perceptible advantage, and that the effects of the disease were such that the keeping of cattle in those places was fast becoming profitless. It appeared on investigation, that the theory of the self-producing character of the disease, or that it was generated in badly ventilated stables, was wholly without foundation; and the commissioners were able to trace the whole disease in its entire course to one cow, brought over in a ship from England about twelve years since, and sold to a German, near South Ferry, Brooklyn. This cow was transferred to one of the herds in Skillman Street, where the disease was never heard of before, and there it died; since which time it has not ceased to prevail there with more or less intensity.

A cow, sick with a very painful disease, was offered to us for examination, and on killing and opening her there were developed precisely the same appearances as witnessed in those cattle killed by order of the commissioners in Massachusetts.

In New Jersey, as in New York, the commissioners had an opportunity for examining the lungs of diseased cattle, and with the same result. They also succeeded in tracing the disease in all cases to Philadelphia, to which place, according to general belief, it was brought by cattle from Holland.

The commissioners feel that they have so managed this subject as to allay the apprehensions of our farmers, and yet they desire to state, that exemption from this great evil can only be purchased by eternal vigilance. We have little fear of it from Brooklyn or New Jersey, but there is danger of its approach by the way of Albany, N. Y., and we should recommend as a matter of common prudence that some commission be kept in existence ready to meet the malady at its first approach.

If New York, New Jersey and Pennsylvania would adopt similar measures to those in this State, it would be one of the most effective modes of securing the whole community against this disease, which, if allowed to prevail, would endanger all the neat stock in the country, and greatly deteriorate the most substantial food of the people. One pertinent fact may be stated here, viz.: that a single cow imported into Australia with this disease shut up in her lungs, has imparted the same, by computation, to no less than 100,000 cattle.

In conclusion the commissioners are satisfied,

1st. That this disease has never been generated in this country from local causes.

2d. That it is altogether an imported disease.

3d. That in general it is communicated by contact of breath.

4th. That it cannot be eradicated by treatment.

5th. That those cattle which apparently recover are the most dangerous, as they are liable at any time to come down with the disease a second time.

6th. That by care it may be prevented from extending from one herd to another.

The appropriation for the expenses of the commission was $5,000. There have been already audited and paid bills to the amount of about $4,800. The estimated amount of bills not yet audited is $900, making in all an expenditure of $5,700, and leaving a deficiency of $700, for which an appropriation is required. This amount is in addition to that paid by the several towns where the disease has existed.

It is due to Dr. E. F. Thayer, one of the members of this Board, to state that in addition to his other labors he has personally as veterinary surgeon examined the lungs of every animal that has died or been killed under suspicion of contagious disease, thus saving a large expense for veterinary service which otherwise must have been incurred. His associates would respectfully recommend an appropriation to pay him $200 for his extra services.

Our thanks are given to the many farmers, drovers and veterinarians who have greatly aided us in our efforts to stay the progress of this disease.

JAMES RITCHIE.
E. F. THAYER.
HENRY L. SABIN.

A committee had been appointed by the Board to investigate the facts which were reported to exist in certain towns in Norfolk County, and to draw up a statement of them for the information of the people. A copy of their statement may be found on page 133 of my last Annual Report. That committee was continued, and at the meeting of the Board, held at the State House, on the 15th of January, 1863, presented the following

REPORT.

At the meeting of this Board, in January, 1862, a committee was appointed to prepare an address to the farmers upon the then present existence of pleuro-pneumonia in the State, and to present before the legislature the importance of immediate legislation, to prevent the spread of this pestilence.

The address was laid before the farmers through the columns of the various agricultural and other journals, and was also embodied in the Report of the Secretary of the Board.

The committee now further report that they were diligent and untiring in their exertions, by the presentation of facts which were daily transpiring, to urge upon the legislature the importance of immediate efficient action.

After much delay, a bill was passed authorizing the governor, with the consent of the council, to appoint a board of three commissioners whenever in his judgment the public good required.

This measure was strongly opposed at every stage, in both branches of the legislature, and after having become a law, the council were slow to be convinced or to allow that the public good required any such appointment, and would consent to make one only by appointing a board the majority of whom were opposed to any legislation upon the subject, and who were known disbelievers in the *contagiousness*, if not in the existence of any such disease; and we believe it is no injustice to the commissioners to say, that at the time of their appointment, none were more thoroughly opposed to the common theory of the disease, and the past action of the State, and former board of commissioners, than were two of the gentlemen composing the present board.

Immediately upon their appointment, the commissioners were notified by the selectmen of Milton, of the existence of the disease in that town in a herd from which two animals had died within a few weeks, and two had been killed by order of the selectmen, being beyond all hope of recovery. The commissioners entered upon their investigations on the 27th of February, 1862. As these investigations progressed, the truth, not only of the existence, but of the *contagiousness* of the disease became so apparent, that notwithstanding previous opinions, and the circumstances under which their commissions were granted and accepted, those opinions and prejudices have vanished before the light of *truth*, and the commissioners have quietly but faithfully performed the duties of their office, and in our opinion should be spared the odium which some have endeavored to throw upon the former board, and should receive the support and co-operation of every friend to the prosperity of the agricultural interest.

We proceed to narrate briefly, the rise and progress of the disease as developed in this vicinity during the past year, beginning with a pair of oxen sold in Brighton market, in February or March, 1861, one of which was, in the opinion of persons who saw him, sick at that time. These oxen were purchased by J. F. Eaton, of Quincy, and taken into his herd. During the next few months not only these oxen, but several animals of his previous herd had died; others were sold and taken into other herds, carrying the disease wherever they went; or, if to change the expression will leave the question more open, we will say, the disease *followed* wherever animals from that herd touched. The disease has exhibited itself in not less than twenty different herds, and in every instance is traceable to the Eaton herd either directly or through other herds connected with it.

The committee are in possession of the names of the twenty individuals whose herds have been thus affected.

We cannot present in a more concise or direct form, a summary of the progress of this disease the past year, and its apparent extinguishment, than by quoting that part of His Excellency's Address before the present legislature, relative to this subject.

He says: "Under the Act of February, 1862, three commissioners were appointed on contagious diseases of cattle,—one a veterinary surgeon, one a doctor of medicine, and the third a member of the executive council, all being of some agricultural experience. They were immediately called by the selectmen of Milton to investigate cases of disease among neat cattle which had broken out there and was creating alarm.

"The animals were carefully examined, and found to be infected by pleuro-pneumonia. The commissioners ordered the entire isolation of all herds of cattle in the counties ot Norfolk, Suffolk, Plymouth and Worcester, which could by any possibility have come into contact with any of the infected animals.

"One hundred and fifty-four animals have died, or have been killed by order of the commissioners, of which number seventy-seven, or just one-half, were found diseased, and in every case but one, *contact* has been proved.

"The commissioners are satisfied that the disease is never generated from local causes; that it is altogether an imported disease; that it cannot be eradicated by treatment; that those cattle which have apparently recovered are really the most to be feared, from the danger of relapse; and that, by care, the disease may be prevented from extending from one herd to another. The expenses of the commission, as nearly as can now be ascertained, are about $5,700. The appropriation being but $5,000, there will be a deficiency to be supplied by legislation.

"The disease is apparently extinguished, and has now no visible foothold in the Commonwealth. The ease and celerity of its eradication by prompt treatment on its re-appearance last year, removes all apprehension that it may hereafter become unmanageable, unless precautionary measures, when needed, shall be too long delayed."

Other Acts relative to this subject were passed by the last legislature; one of which provides that "whenever cattle exposed to contagious diseases are killed by order of the commissioners, and upon a *post mortem* examination shall be found to have been entirely free from disease, it shall the duty of the commissioners to cause the same to be sold under their direction, first giving to the purchaser notice of the facts; and if the said purchaser or any other person shall sell said slaughtered cattle or any part thereof, they shall in like manner give notice to the parties to whom the same is sold; and the proceeds of the sales made by order of the commissioners shall be applied in payment of the apprized value of said cattle."

This seems a wholesome provision, and is found to relieve in some measure the treasury of the Commonwealth, and also removes an objection often urged against the indiscriminate slaughter of animals exposed to contagion, namely, that of waste.

Some months since the board of commissioners made a statement of their doings and experience with the disease, together with an appeal to the farmers of the State, which is at once so clear and convincing that we deem it worthy a place in this report:

To the Farmers of Massachusetts:

The disease termed pleuro-pneumonia has appeared in several herds of cattle in the eastern portion of the State during the present season. The State cattle commissioners have adopted the most effective measures to prevent its dissemination. All cattle that have been exposed, with the exception of four, have been destroyed. The commissioners have been forced to this mode of action by the logic of facts. These have been scrutinized with the utmost care and vigilance. No opportunities have been suffered to pass without improvement, and no efforts have been regarded as vain which promise to throw light upon the origin and characteristics of the disease. Two of the three commissioners commenced their labors with a feeling that by careful inquiry and by thorough examination, they should be enabled to demonstrate to the public the inexpediency of the action of the former board of commissioners, as well as the groundlessness of the apprehensions of many in regard to the fatal character of the disease.

A number of persons had published treatises to prove that pleuro-pneumonia was generated in poorly-ventilated barns, and was not infectious. The facts, as developed to the commissioners, have constrained them to discard their first impressions, and to deny the positions of the various writers before alluded to. They have, moreover, thoroughly convinced themselves that the worst apprehensions in regard to the disease are well founded and wise. They have found the disease prevailing in barns of every variety of structure, and of all degrees of ventilation, and even in the open fields. They have traced it from root to branches, whither it flows as surely as the sap flows in trees. They do not find a single case outside of the line of transmission. As surely as every rivulet tends toward the sea, does each case connect itself with its fountain head. The conclusion is irresistible, that if any disease be infectious this one is. In Massachusetts the disease was introduced by four Dutch cattle imported by Mr. Chenery, of Belmont.

But it is said the same disease exists in New York, New Jersey and Pennsylvania. The commissioners determined to see for themselves. They went to New Jersey. They were met in Bordentown by a veterinary surgeon of that place, Dr. Jennings, by a large stock-breeder and noble-hearted farmer, Adolph Mailliard, and by others, members of a committee of the agricultural societies. They visited herds which had been infected with disease; found some where a large portion had died. They killed and examined a sick cow, and identified the disease with that in Massachusetts. In all instances where it existed, it had been introduced by cattle brought from Philadelphia. The apprehensions of the farmers in that region had been aroused, and the commissioners found that a species of isolation had been resorted to; but this was far from being thorough and efficient. Cattle were allowed on the highway, even in some of the infected districts. Very erroneous impressions existed in regard to the character of the disease, even among those who were called to treat it. Attention was given only to such animals as had come down with the disease, and attempts were made to treat these by various remedial processes, and those which lived and recovered their vital energies were regarded as safe—an error, than which, none more fatal exists. It has been demonstrated to the commissioners for Massachusetts, that the last state of this disease is more pernicious than the first,—in other words, that recovery is worse than death. We say to the farmers of Massachusetts, when the disease appears in your herds, separate the sick from the well, and both from all other cattle; fatten the cattle if you can, for beef, and kill all of them. This is the only safe and effective remedy.

The commissioners followed the trail of the Bordentown disease to Philadelphia. There the disease had committed great ravages; one man was reported as having lost his entire herd of sixty cattle. Treatment was here resorted to as in Bordentown, but the disease had evidently become an *institution*, and was looked upon with apathy by all classes. They neither looked for its origin nor contemplated its future. Hence, as in England, many regard the disease very much as they do those diseases which affect various kinds of fruit trees; as an evil to be endured, which will have its course and then disappear. In the meantime they must drink the milk and eat the meat of animals whose inflamed or putrid lungs cannot supply the due and healthy proportion of oxygen to the blood.

From Philadelphia the commissioners proceeded to Brooklyn, New York, to visit the herds said to be infected with a milk-disease similar in its character to the pleuro-pneumonia of Massachusetts. They went directly to Skillman Street, to the place described by Frank Leslie in his illustrated paper. Near the cattle-sheds were several cows apparently dying from disease, whose symptoms did not differ from those of cattle infected with pleuro-pneumonia. Leslie's description had impressed us with the idea that the cows in these places had been fed with offal collected from the city, and that in consequence, and by reason of bad ventilation, the disease had been there generated. This opinion seems to have been endorsed by the surgeons who had visited those places. They had entirely misrepresented the state of the case. By the kindness and favor of Messrs. Wilson and Fletcher, distillers, we were permitted to examine the cattle of various milk dairies. Mr. Fletcher, who, by the way, is a Massachusetts man and every inch a gentleman, conducted us through the cattle-sheds and explained to us the mode of feeding. The "swill," about which so much is said, proves to be nothing more or less than the distillery grains, so highly prized in this region for feeding cattle. In addition to these, more hay of the very best quality is fed out than is generally fed by the farmers of Massachusetts.

It was evident to us that no disease was there generated. Mr. Fletcher kindly procured for us a sick cow, which was killed and examined, and proved to be affected with the genuine, infectious pleuro-pneumonia. One man had lost his whole herd of forty by the disease. Whence did it come? The information was voluntarily proffered. It was brought over by a cow in a ship from England about the year 1850. This cow was taken on board to supply milk, and after the arrival of the ship, was sold to a dairyman near the South Ferry, in Brooklyn. This cow had the veritable pleuro-pneumonia, which she disseminated and which previously had never been known there. The disease spread with great rapidity, annually taking off more than fifteen per cent. of the cattle. The practice of inoculation was resorted to but without beneficial results. The value of the milk business in that section is nearly destroyed. The cattle that do not die are fattened and killed for beef, which confines the disease, happily, to that region.

Farmers of Massachusetts! be not beguiled into a false security. By efficient regulations and prompt action, this fatal disease may be excluded from the limits of our State. But in this matter, the price of exemption is eternal vigilance. Be on your guard; keep all unknown and suspected cattle far from your herds. See that no stray cows are allowed to wander in your streets, and even take care to know the state of each herd whence come cows to be served by your bulls. Especially be cautious as to the cattle sent to a distance in the country to be pastured and do not allow them to be returned to your farms in the fall without a clean bill of health. Be not afraid of being thought "fussy," and, in particular, place no reliance upon the theories of inexperienced or prejudiced parties who may strive to persuade you that this disease is not infectious, or that animals which have once had it and have recovered, are safe companions for other cattle. Total abstinence from all that can contaminate is the only safety. This is our faith, the result of our study and experience.

James Ritchie,
E. F. Thayer,
Henry L. Sabin,
Cattle Commissioners.

Boston, June 3, 1862.

The facts which have thus been brought to light, by the action of the second board of commissioners, would authorize the committee to sustain in full the action of the first board; and it is a simple act of justice to remind the public that the course adopted at Brookfield, where the disease first attracted attention, has been followed out at Quincy, and other places where it made its last appearance.

Your committee are convinced that the board of commissioners, authorized by the statute of 1862, should be kept in organization, ready for any emergency; thus avoiding the delay, and consequent spread of the disease which has occurred upon both previous occasions of its appearance in Massachusetts.

We recommend that a committee be charged with such supervision in this matter as may properly be exercised by this Board; and that said committee be instructed to use their influence to procure an early appointment to fill any vacancy in that board which may at any time occur.

P. STEDMAN, *for the Committee.*

In the year 1859, the State Board of Agriculture caused the offer of premiums by the various agricultural societies for the best conducted experiments on the application of manures, each experiment to extend over a period of three years.

To secure a greater degree of attention to this important design, the Massachusetts Society for Promoting Agriculture not only offered large and liberal premiums on the basis required by the Board, but opened the competition to those who entered their experiments for the awards offered by the county societies thus holding out very strong inducements to effort throughout the State.

A new series has been begun each year since the programme was first instituted, but only the first series thus begun in 1860 has been completed. The importance of these experiments can hardly be understood and fully appreciated till several series are concluded, forming with those begun in 1860, an accumulation of results, each adding to the value of all the others.

At the annual meeting in January, 1863, the committee of the Board having this subject in charge, submitted the following

REPORT.

By a reference to the report of the committee on manures, made in 1859, it will be seen that on the 5th day of December, in that year, the Board of Agriculture directed the issue of the following circular to all the agricultural societies receiving the bounty of the Commonwealth.

AGRICULTURAL DEPARTMENT, BOSTON,
December 5, 1859.

Dear Sir,—At a meeting of the State Board of Agriculture, held on the 1st inst., it was

"*Voted*, That the several Agricultural Societies receiving the bounty of the State, be required to offer three premiums for the most thorough exact and reliable experiments upon the proper depth of applying manures, payable in the fall of 1862, as follows:—

"Select a level piece of land of any convenient size, from twenty square rods up to as many acres or more, which should be as nearly equal in its character and conditions as possible. Divide it into five equal parts, numbering them 1, 2, 3, 4 and 5, for a rotation of three years.

"Divide the manure which it is proposed to apply, and which should be of a uniform character, into four equal parts. At the time of first ploughing in the spring, spread evenly one-fourth of the manure upon plot No. 1, and then plough the whole field of an equal depth. Apply another fourth part of the manure to plot No. 2, and then cross-plough the whole field to about half the depth of the first ploughing. Spread another fourth of the manure upon plot No. 3, and harrow or cultivate the whole field; after which sow or plant the whole evenly, with any crop preferred. Finally, spread the remaining quarter part of the manure upon plot No. 4.

"Observe that by pursuing this course, each of the five lots will receive equally, a deep ploughing, a shallow ploughing, and a harrowing or cultivating, the only difference in them being that in No. 1 the manure is buried deep, in No. 2, shallow, in No. 3 buried only slightly, but coated with loam, and in No. 4 left exposed upon the surface; while No. 5 gets no manure. The manure is to be spread broadcast and as evenly as possible. The after cultivation should be the same on each of the lots, and the harvest of each should take place at the same time.

"Let a statement of the character of the soil, whether light or heavy, dry or moist, leachy or retentive of manures, the crop of 1859, kind and amount and mode of application of manure in 1859, size of field covered by the experiment, depth of first ploughing, kind and amount of manure used in 1860, kind of crop, when and how sown, number of times and manner cultivated, and weight of product on an average rod of each plot be made in 1860, and returned in the annual report of each society.

"If there is a double product, as grain and straw, corn and stover, let the weight of the secondary product be given on each plot.

"If the competitor weigh the whole crop, instead of estimating it by an average rod, there will be no objection to such a course.

"A brief synopsis of the weather for each of the following months, by dividing each month into three parts, and using the terms dry, moist, and wet, to indicate the general character of the weather, will also be expected.

FIRST THIRD.	MIDDLE THIRD.	LAST THIRD.
May,		
June,		
July,		
August,		
September,		

"A similar report of all the above items, except the nature of the soil, will be made in 1861, and in 1862, when the premiums will be awarded. No manure is to be applied to the second and third crop."

"*Voted*, That the Secretary of the Board be requested to notify the several societies of the above as soon as convenient; and that the societies be requested to offer premiums which will secure an adequate compensation for the time and labor consumed in the experiment."

I hereby notify your society of the above vote. Evidence of a compliance with it will be required before I shall feel authorized to draw a certificate for the bounty to any society.

One of the greatest obstacles in the way of agricultural progress is the difficulty of obtaining reliable facts and statistics as a basis upon which to establish principles and construct theories. As a general rule, theories are first advanced, and then isolated facts are brought forward for the purpose of proving their truthfulness. It is true that agriculture is not, in the usual sense of the term, and probably never will become, one of the exact sciences; yet there are many things connected with it which ought to be taken out of the region of conjecture, and placed, by repeated and multiplied experiment, upon a more substantial basis. A single fact or experiment may be of only trifling value in itself considered, but when added to scores or hundreds of others, the whole collectively may elucidate a doubtful point, or settle a vexed question.

With these considerations in view, the Board asks and requires the attention of every society in the State, to render any aid in the solution of the question here considered, and to act in concert with them, and with each other, in such a way as to give to the result the greatest possible practical and scientific value. I would suggest that the rotation be limited to corn, grain and grass.

Allow me to call your attention to the Act of 1859, ch. 232, sections 1, 2 and 3, and especially to sections 4 and 5, authorizing the Board to make the above requirement, and the penalty of a disregard of, or a failure to comply with it.

I would simply suggest that premiums of $25, $20, and $15, have been offered by some of the societies, and that it is desirable that no offers should be smaller than these amounts, as the object above indicated is to induce a multiplicity of experiments.

Very truly, your obedient servant,

Charles L. Flint, *Secretary State Board of Agriculture.*

To the Secretary of the Society.

In response to the offers of premiums required in the circular, and more particularly in response to liberal offers made by the Massachusetts Society for Promoting Agriculture, covering and in addition to those of the county societies, fifteen experiments were commenced. One has been relinquished, and fourteen have been carried through the three years' course to completion. It is proper for us here to express our especial obligations to P. C. Brooks, Jr., Esq., the obliging Secretary of the Massachusetts Society for Promoting Agriculture, for his kindness in placing in our hands the returns of these experiments as received from the competitors, otherwise through the negligence of the secretaries of some of the agricultural societies who failed to return copies to the Secretary of the Board of Agriculture, we should have been deprived of them entirely. A condensed summary of each experiment is here given for future reference and comparison.

Results of the Experiments in 1860.

No. I.

By Elihu Belden, of Whately. One acre of moist, retentive soil. Crop in 1859, tobacco, with 1,200 pounds of guano and 300 pounds of super-phosphate. First ploughing in 1860, twelve inches. One thousand five hundred and sixty-five pounds of guano was used on the four plots. Tobacco plants set June 20th to 26th. Hoed three times. Harvested 3d to 7th of September.

PRODUCT.

No. 1,	tobacco,	342 lbs.
2,	"	432
3,	"	401
4,	"	401
5,	"	255

WEATHER.

	First Third.	Middle Third.	Last Third
May,	dry.	moist.	moist.
June,	moist.	dry.	moist.
July,	moist.	dry.	moist.
August,	wet.	moist.	dry.

No. II.

By J. B. V. Coburn, of Dracut. One and one-fourth acres of Merrimack interval. Fine loam, rather moist and retentive. In grass for five years previous to 1860. About a ton of hay to the acre in 1859. First ploughing, eight inches deep, second, four. Twelve cords of compost, one-half manure from stock and one-half loam, on the four lots. Planted with corn May 17th. Cultivated and hoed three times. Cut stalks September 26th. October 20th, harvested an average rod on each plot and shelled the corn.

PRODUCT.

No.				
No. 1,	shelled corn,	800 lbs;	stover,	980 lbs.
2,	"	1,319	"	1,480
3,	"	1,337	"	1,640
4,	"	1,162	"	1,360
5,	"	301	"	480

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	wet.
June,	moist.	moist.	moist.
July,	moist.	moist.	moist.
August,	dry.	moist.	dry.
September,	moist.	wet.	wet.

No. III.

By L. W. Curtis, of Globe Village. About an acre, moist, retentive. Manured in 1858. Mixed crops in 1859. First ploughing eight inches, second four. Ten and one-half cords of mixed stable and yard manure on the four lots. Five varieties of corn were planted crossways of the lots. Cultivated three times and hoed twice. Stalks cut September 14th. Corn harvested the second week in October.

PRODUCT.

No. 1,	good corn,	744 lbs.;	poor corn,	102 lbs.;	stover,	1,155 lbs.
2,	"	900	"	82	"	1,265
3,	"	944	"	78	"	1,199
4,	"	791	"	121	"	1,275
5,	"	282	"	205	"	705

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	wet.
June,	wet.	wet.	wet.
July,	wet.	moist.	moist.
August,	wet.	wet.	wet.
September,	moist.	wet.	wet.

No. IV.

By E. W. Gardner, of Nantucket. Ten thousand one hundred and twenty-five square feet. Rich, sandy loam, clayey and gravelly subsoil, retentive but not wet. For five years in grass without manure. In 1859, after the hay was harvested, six cords of barn cellar manure per acre were applied and turnips sown. Turnips mostly a failure; those which grew were very fine. In 1860 ploughed eight inches deep first time, second, four. Three cords of horse, cow and hog manure, with a little peat muck, were applied to the four lots. Three varieties of corn were planted May 11th. Cultivated and hoed twice. Cut stalks September 10th. Harvested and weighed October 31st.

PRODUCT.

No. 1,	corn in the ear,	206 lbs;	stover,	239 lbs.
2,	"	222	"	236
3,	"	164	"	189
4,	"	146	"	187
5,	"	40	"	82

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	dry.
June,	dry.	dry.	dry.
July,	dry.	dry.	dry.
August,	dry.	moist.	dry.
September,	dry.	dry.	moist.

This statement in much greater detail may be found on page 134, of the Agriculture of Massachusetts for 1860.

No. V.

By Spencer Leonard, Jr., of Bridgewater. Sixty square rods. Rather light with a sandy subsoil, but neither very dry or very wet. In grass for six or seven years without manure. Crop in 1859, about 1,200 pounds per acre. First ploughing, seven inches deep; 272 cubic feet of manure on the four lots. Planted with smutty white corn. Cultivated four times and hoed twice. Cut stalks September 10th. Harvested and weighed October 25th. Commenced harvesting the day after a rain, and during the three or four days of harvesting it grew dry. This may account in part for the difference in the weight of stover, it being harvested and weighed in the order of numbering.

PRODUCT.

No.			corn in the ear, lbs.		stover, lbs.
No. 1,	corn in the ear,		282¾ lbs.;	stover,	346 lbs.
2,	"	"	407	"	330
3,	"	"	321¾	"	274
4,	"	"	321½	"	232
5,	"	"	234½	"	136

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	dry.
June,	moist..	dry.	dry.
July,	moist.	dry.	wet.
August,	moist.	moist.	moist.
September,	dry.	moist.	moist.

The statement leaves it uncertain whether the cross-ploughing extended over the whole field, or was confined to No. 2.

No. VI.

By John Patridge, of Pittsfield. Two and one-half acres of land. Sand and gravelly loam; subsoil the same, dry and leachy. Pastured twenty years. First ploughing, seven inches. Forty ox-cart loads of manure on the four lots. One-half barnyard, one-third stable, and a little hog manure. Planted with small, yellow, eight-rowed corn, May 22d. Ploughed and hoed twice. Twenty rods on each plot was weighed.

PRODUCT.

No. 1,	corn,	964 lbs.;	stover,	1,068 lbs.
2,	"	1,252	"	1,496
3,	"	1,540	"	1,688
4,	"	1,072	"	1,232
5,	"	860	"	1,132

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	moist.
June,	moist.	dry.	dry.
July,	moist.	moist.	moist.
August,	moist.	wet.	wet.
September,	moist.	moist.	wet.

Thinks one-fourth of the crop on No. 1 was destroyed by worms. Nos. 2 and 3 suffered considerably, and No. 4 a little.

No. VII.

By C. O. Perkins, of Becket. Seventy-five rods of land. Yellow loam. Crop of 1859 sowed corn, with twenty-eight loads of manure. First ploughing nine inches, second five. Twelve loads of manure to the four lots. Planted with white Canada corn May 18th. Hoed three times. Cut up at the ground September 24th. Husked and weighed October 25th. Crop a poor one. Season wet and cold.

PRODUCT.

No. 1, .	corn in the ear,	181 lbs.;	stover, 222 lbs.
2, .	" "	220	" 262
3, .	" "	234	" 223
4, .	" "	269	" 343
5, .	" "	165	" 189

WEATHER.

	First Third.	Middle Third.	Last Third.
May, .	dry.	moist.	moist.
June, .	wet.	dry and hot.	wet and cold.
July, .	moist and cold.	moist and cold.	moist and cold.
August, .	"	"	"
September,	"	moist and warm.	dry.

No. VIII.

By Levi Stockbridge, of North Hadley. One and one-half acres of land. Light, sandy loam, with a sandy subsoil. Leachy. Well manured in 1857 for corn. 1858, rye without manure, and grass since. First ploughing eight inches, second four. Fourteen hundred cubic feet of manure,—one-half green manure, and one-half crude muck, mixed April 1st, and forked over twice, with a little plaster added,—on the four lots. Planted with eight-rowed yellow corn, May 18th. Three times machine hoed and once by hand. Corn cut up September 22d. Husked October 29th, and shelled January 4th.

PRODUCT.

No. 1, .	shelled corn,	720 lbs.;	stover, 940 lbs.
2, .	" "	615	" 900
3, .	" "	606	" 760
4, .	" "	509	" 544
5, .	" "	422	" 740

WEATHER.

	First Third.	Middle Third.	Last Third
May, ...	moist.	dry.	dry.
June, ...	moist.	moist.	moist.
July, ...	wet.	moist.	wet.
August, ...	wet.	moist.	dry.
September, . . .	dry.	moist.	moist.

No. IX.

By ALBERT STRATTON, of North Leominster. Forty-five rods of land, rather heavy, moist and retentive. Grass in 1859 without manure. First ploughing, seven to eight inches. Two hundred and forty bushels of barn manure for the four lots. Planted with corn May 25th. Twice horse hoed, and once ploughed, and each time hand hoed. Harvested October 16th.

PRODUCT.

No. 1, .	corn in the ear,	125 lbs.;	stover, 140 lbs.
2, .	" "	200	" 210
3, .	" "	203	" 215
4, .	" "	155	" 165
5, .	" "	60	" 65

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	dry.	very dry.	moist.
June, ...	wet.	moist.	moist.
July, ...	wet.	moist.	wet.
August, ...	moist.	wet.	moist.
September, . . .	moist.	wet.	wet.

No. X.

By JUSTUS TOWER, of Lanesborough. One acre of clay loam, retentive of manures. Crop of 1859, potatoes and corn, with about seven and one-half cords of green manure ploughed under six inches. First ploughing in 1860, eight inches, second, four. Eight cords of partially decomposed horse stable manure for the four lots. Planted with corn May 12th. Hoed three times. Cut up at the roots September 23d, and harvested October 20th.

PRODUCT.

No. 1,	. corn in the ear,	858 lbs.;	stover, 800 lbs.
2,	. " "	951	" 728
3,	. " "	909	" 692
4,	. " "	759	" 640
5,	. " "	672	" 510

No. 5 was small ears poorly ripened, nearly one-third being soft corn.

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	dry.	dry.	wet.
June, ...	dry.	wet.	moist.
July, ...	moist.	moist.	wet.
August, ...	wet.	wet.	wet.
September, . . .	moist.	wet.	wet.

No. XI.

By B. P. Ware, of Marblehead. Fifty rods of dark loam on a compact gravelly subsoil, retentive and not liable to suffer from extremes of moisture or drougth. In grass for ten years. The sod was broken up in August, 1859. First ploughing in 1860, eight inches, second, four inches. Two and one-quarter cords of a compost made from equal parts of peat mud, sea and stable manure, on the four lots. Planted with Jackson white potatoes, April 18th. Ploughed and hoed three times, and harvested October 31st.

PRODUCT.

No. 1,	large potatoes,	700 lbs.;	small potatoes,	292 lbs.;	total,	992 lbs.
2,	" "	797	" "	347	"	1,144
3,	" "	635	" "	305	"	940
4,	" "	690	" "	357	"	1,047
5,	" "	580	" "	215	"	795

No. 6, large potatoes, 630 lbs.; small potatoes, 265 lbs.; total, 895 lbs.

A sixth lot was added of the same size as the others, and manured with the same amount and kind of manure, but it was put in the drill, as generally practiced.

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	very dry.	moist.
June,	moist.	moist.	moist.
July,	wet.	wet.	moist.
August,	moist.	moist.	wet.
September,	wet.	moist.	wet.

No. XII.

By Josiah White, of Petersham. One acre of heavy, moist loam, on a clay subsoil. Retentive. Crop of 1859 was corn upon sward, with eight cords of green manure harrowed in. First ploughing in 1860, eight inches, second, four. Twelve cords of green barn cellar manure on the four lots. Planted with small Canada corn, May 17th. Horse hoed three times. Harvested October 5th, and weighed November 10th.

PRODUCT.

No. 1,	corn in the ear, 676 lbs.;	stover,	350 lbs.
2,	" " 754	"	436
3,	" " 772	"	490
4,	" " 525	"	360
5,	" " 380	"	240

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	moist.
June,	wet.	moist.	wet.
July,	moist.	wet.	moist.
August,	moist.	wet.	wet.
September,	wet.	wet.	moist.

No. XIII.

By I. B. Woodward, of Fitchburg. Twenty rods of rather heavy, black loam, on a clay subsoil. Moist and retentive. Crop of 1859, potatoes, with about three cords of horse manure to the acre. First ploughing in 1860, eleven inches. One hundred and twenty bushels of green barn manure for the four lots. Planted with corn, May 9th. The crop was destroyed by the combined ravages of the wire-worm and the cut-worm, but the land was reserved for further experiment.

No. XIV.

By W. G. Wyman, of Fitchburg. One acre of heavy loam on a clayey subsoil. Moist and retentive. Grass, with no manure for three years. First ploughing about seven inches. Four cords of barn manure, 400 lbs. of Coe's ground bone, and 200 lbs. of Coe's super-phosphate of lime on the four lots. Planted with yellow corn, May 23d. Horse hoed four times each way, and hand hoed twice. Harvested November 5th.

PRODUCT.

No. 1,	sound corn in ear, 879 lbs.;	soft corn in ear, 11 lbs.;	stover, 1,100 lbs.
2,	" " 785	" " 26	" 1,034
3,	" " 851	" " 22	" 1,092
4,	" " 819	" " 21	" 954
5,	" " 349	" " 54	" 354

No. 6, sound corn in ear, 859 lbs.; soft corn in ear, 00 lbs.; stover, 958 lbs.

A sixth lot was added of the same size, and treated like the others, except that one-third each of the barn manure and ground bone were ploughed in deep, one-third ploughed in shallow, and one-third harrowed in. The super-phosphate was applied to the hills after planting.

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	dry.	very dry,	moist.
June, ...	wet.	moist.	wet.
July, ...	very wet.	wet.	wet.
August, . . .	moist.	wet.	moist.
September, . . .	moist.	wet.	wet.

Results of the Experiments in 1861.

No. I.

By Elihu Belden, of Whately. Repeated the ploughing and manuring of 1860, and planted tobacco again.

PRODUCT.

No. 1, . . .	tobacco,	336 lbs.
2, . . .	"	343 "
3, . . .	"	351 "
4, . . .	"	337 "
5, . . .	"	125 "

The crop on the first four plots sold for ten cents per pound, and on No. 5 for eight cents.

No. II.

By J. B. V. Coburn, of Dracut. Ploughed the third week in April, and sowed with wheat, Timothy and clover.

PRODUCT.

No. 1, . .	wheat, 273 lbs.;	straw, 480 lbs.
2, . .	" 308	" 600
3, . .	" 280	" 520
4, . .	" 236	" 650
5, . .	" 140	" 250

No. III.

By L. W. Curtis, of Globe Village. Sowed with barley, Timothy and redtop.

PRODUCT.

No. 1, . . .	barley, 344 lbs.;	straw, 160 lbs.
2, . . .	" 408	" 166
3, . . .	" 496	" 200
4, . . .	" 509	" 206
5, . . .	" 208	" 140

No. IV.

By E. W. Gardner, of Nantucket. Ploughed eight inches deep. Sowed with Java wheat, redtop, Timothy, and red clover, April 9th. Harvested wheat July 31st.

PRODUCT.

No. 1,. . .	wheat, 32½ lbs.;	straw, 51½ lbs.
2,. . .	" 28	" 71
3,. . .	" 34	" 103
4,. . .	" 23	" 90½
5,. . .	" 14	" 19

No. V.

By Spencer Leonard, Jr., of Bridgewater. Ploughed seven inches deep. Sowed May 6th, with barley, clover, Timothy, and blue grass. Harvested barley July 24th, and weighed August 1st.

PRODUCT.

No. 1, . .	barley,	$46\frac{1}{2}$ lbs.;	straw,	63 lbs.
2, . .	"	53	"	75
3, . .	"	49	"	64
4, . .	"	47	"	64
5, . .	"	$29\frac{1}{2}$	"	39

No. VI.

By JOHN PATRIDGE, Pittsfield. Ploughed seven or eight inches deep. Sowed oats, April 9th. Twenty rods on each plot weighed.

PRODUCT.

No. 1, . .	oats,	1,016 lbs.;	straw,	1,396 lbs.
2, . .	"	956	"	1,200
3, . .	"	1,108	"	1,460
4, . .	"	1,008	"	1,260
5, . .	"	796	"	1,056

No. VII.

By C. O. PERKINS, of Becket. Ploughed six inches deep. Sowed with barley, May 11th. Harvested August 23d. Weighed August 30th.

PRODUCT.

No. 1, . .	barley,	$80\frac{1}{2}$ lbs.;	straw,	77 lbs.
2, . .	"	97	"	94
3, . .	"	102	"	92
4, . .	"	99	"	88
5, . .	"	74	"	$62\frac{1}{2}$

No. VIII.

By LEVI STOCKBRIDGE, of Hadley. Ploughed eight inches deep, and wheat sown April 15th.

PRODUCT.

No. 1, . .	wheat,	$273\frac{7}{16}$ lbs.;	straw,	261 lbs.
2, . .	"	$273\frac{179}{256}$	"	216
3, . .	"	$273\frac{179}{256}$	"	237
4, . .	"	$291\frac{1}{4}$	"	240
5, . .	"	$216\frac{89}{256}$	"	219

No. IX.

By ALBERT STRATTON, of North Leominster. Ploughed seven inches deep, and sowed with oats and grass, May 18th. Harvested August 17th, and weighed one week later.

PRODUCT.

	oats	straw
No. 1,	54 lbs.;	115 lbs.
2,	52	106
3,	50	104
4,	52½	105
5,	44	91

No. X.

By JUSTUS TOWER, of Lanesborough. Ploughed ten inches deep. Sowed oats the first week in May. Harvested the first week in August. Injured by the aphis.

PRODUCT.

	oats	straw
No. 1,	418½ lbs.;	675 lbs.
2,	387½	641
3,	330	510
4,	304½	460
5,	247	390

No. XI.

By B. P. WARE, of Marblehead. Ploughed eight inches deep. Sowed orange globe mangolds, June 1st. Hoed three times and weeded twice. Harvested October 29th.

PRODUCT.

No. 1,	3,170 lbs.
2,	3,160
3,	3,200
4,	2,810
5,	2,110
No. 6,	4,500 lbs.

Lot No. 6, as marked in 1860, had four and one-half cord feet of compost manure harrowed in. Treated otherwise like the other lots.

No. XII.

By Josiah White, of Petersham. Ploughed nine inches deep. May 9th, sowed barley and grass. Harvested August 25th.

PRODUCT.

No. 1, . . .	barley, 466 lbs.;	straw, 654 lbs.
2, . . .	" 484	" 771
3, . . .	" 464	" 766
4, . . .	" 392	" 588
5, . . .	" 340	" 455

No. XIII.

By I. B. Woodward, of Fitchburg. Ploughed seven inches deep, and sown with wheat the first week in May. Harvested August 16th. One-fourth part of No. 2 was badly injured by worms.

PRODUCT.

No. 1,	wheat, 32 lbs.	14 oz.;	straw, 46 lbs.	7 oz.
2,	" 27	10	" 39	6
3,	" 30	14	" 44	11
4,	" 29	14	" 39	9
5,	" 23	6	" 31	12

No. XIV.

By W. G. Wyman, of Fitchburg. Ploughed six to seven inches deep. Sowed May 3d with Scotch fife wheat, Timothy, redtop and clover. Harvested the wheat August 16th, and weighed October 5th. The whole crop was much injured by the aphis, and somewhat by the weevil, but very evenly on all the lots.

PRODUCT.

No. 1, . . .	wheat, 203 lbs.;	straw, 466 lbs.
2, . . .	" 170	" 403
3, . . .	" 192	" 449
4, . . .	" 183	" 503
5, . . .	" 62	" 255
No. 6, . . .	wheat, 163 lbs.;	straw, 446 lbs.

On lot No. 6, in 1860, the manures were mixed in their application to the soil.

Results of the Experiments in 1862.

No. I.

By Elihu Belden, of Whately. Ploughed twelve inches deep September 10th, 1861, and sowed wheat. Somewhat injured in the spring of 1862 by a freshet. No. 4 suffered more than the others. Harvested the first week in August.

PRODUCT.

No. 1, . . .	wheat, 313 lbs.;	straw, 533 lbs.
2, . . .	" 256	" 436
3, . . .	" 249	" 429
4, . . .	" 198	" 389
5, . . .	" 191	" 383

No. II.

By J. B. V. Coburn, of Dracut. Grass was cut the second week in July, and again in September.

PRODUCT.

No. 1, .	1st crop	dry hay,	1,680 lbs.;	2d crop,	760 lbs.;	total,	2,440 lbs.
2, .	"	"	1,720	"	840	"	2,560
3, .	"	"	1,360	"	680	"	2,040
4, .	"	"	1,400	"	600	"	2,000
5, .	"	"	600	"	not worth cut'g,	"	600

No. III.

By L. W. Curtis, of Globe Village. Crop, redtop and Timothy.

PRODUCT.

No. 1, ...	736 lbs.
2, ...	768
3, ...	832
4, ...	800
5, ...	384

No. IV.

By E. W. Gardner, of Nantucket. Crop was Timothy and clover, cut July 15th.

PRODUCT.

No. 1, ...	hay, 205 lbs.
2, ...	" 200
3, ...	" 250
4, ...	" 140
5, ...	" 120

No. V.

By Spencer Leonard, of Bridgewater. Grass cut July 8th, and well cured.

PRODUCT.

No. 1,	150 lbs.
2,	172
3,	167
4,	175
5,	88

No. VI.

By John Patridge, of Pittsfield. Timothy and clover. Twenty rods on each plot weighed.

PRODUCT.

No. 1,	1,048 lbs.
2,	1,092
3,	1,192
4,	1,120
5,	416

No. VII.

By C. O. Perkins, of Becket. Timothy and clover, harvested July 19th.

PRODUCT.

No. 1,	416 lbs.
2,	441
3,	499
4,	479
5,	388

No. VIII.

By Levi Stockbridge, of Hadley. Timothy and clover were cut July 8th.

PRODUCT.

No. 1,	825 lbs.
2,	694
3,	643
4,	544
5,	487

No. IX.

By ALBERT STRATTON, of North Leominster. Well dried hay, harvested August 1st.

PRODUCT.

No. 1,	288 lbs.
2,	269
3,	336
4,	345
5,	258

A small portion of No. 2 was winter killed, or did not take well to grass.

No. X.

By JUSTUS TOWER, of Lanesborough. Ploughed the oat stubble eight inches deep, the first week in September, 1861, and sowed Timothy and clover. Harvested July 1st.

PRODUCT.

No. 1,	646 lbs.
2,	725
3,	590
4,	510
5,	320

No. XI.

By B. P. WARE, of Marblehead. Crop, carrots without manure. Ploughed eight inches deep. May 29th sowed orange carrot seed. Truckle hoed three times, and hand wed twice. Harvested November 14th.

PRODUCT.

No. 1,	2,715 lbs.
2,	2,660
3,	2,950
4,	2,690
5,	2,755
No. 6,	3,220 lbs.

The lot numbered six, in previous years, was manured with $\frac{9}{16}$ of a cord of compost of meadow mud, sea manure and barn manure, drenched with night soil. Otherwise treated like the other lots.

No. XII.

By Josiah White, of Petersham. Timothy and clover; harvested July 19th.

PRODUCT.

No. 1,	1,170 lbs.
2,	1,205
3,	1,100
4,	1,070
5,	980

No. XIII.

By I. B. Woodward, of Fitchburg. One crop of dry hay.

PRODUCT.

No. 1,	130 lbs.
2,	135
3,	136½
4,	146
5,	88½

No. XIV.

By W. G. Wyman, of Fitchburg. Crop mostly clover. First crop harvested July 12th, and second, September 6th.

PRODUCT.

No. 1,	first crop, 1,163 lbs.;	second crop, 568 lbs.;	total, 1,731 lbs.
2,	" 1,106	" 747	" 1,853
3,	" 1,039	" 653	" 1,692
4,	" 1,001	" 402	" 1,403
5,	" 358	" 73	" 431

No. 6, ... first crop, 1,287 lbs.; second crop, 581 lbs.; total, 1,768 lbs.

To bring out the results contained in these statements, and make available their teachings, it is necessary to exhibit them in a tabular form, where comparisons may be readily seen and easily comprehended. This has been attempted in the following table. We are aware that it does not present all which might be made to appear, but the more prominent points are given, and the facts are still available for a further analysis hereafter, when additional experiments shall yield their results.

The table is thus arranged. The columns are numbered by figures placed at the head of each. The 1st contains the numbers applied to each experiment. The 2d, the names and residence of the experimenters. 3d, the number of square rods of land covered by each experiment. 4th, the quality and condition of the soil. 5th, its condition previously to the commencement of the experiment. 6th, the number of cords per acre of manure used, and its quality and condition in 1860. 7th, the depth of the first ploughing, in inches. 8th, date of planting. 9th, the kind of seed.

In columns 10 to 14, inclusive, the condition of the weather for each of the months, May, June, July, August, and September, 1860, is shown. The upper term corresponding to the first third of the month, the middle term to the middle third, and the lower term to the last third. Column 15 gives the condition in which the crop was weighed. 16 to 20, inclusive, contain the weights of the several products, calculated in pounds per acre. The upper figures in each division applying to the principal product, and the lower, if any, to the secondary. The middle figures in two instances exhibit the quantity of unsound corn. The numbers at the top of these last five columns, correspond to the numbers of the plots in the experiments. Column 21st, gives the depth to which the ground was ploughed, in preparation for the crop of 1861. The 22d shows the condition of the crop, or its character, as weighed. 23 to 27, inclusive, give the weights per acre on each of the five plots, as in the previous year. 28 gives the crop of 1862. 29 to 33, inclusive, show the weights per acre on each plot, as in the two former years. No. 34 serves to explain those which follow. The upper figures in each division of column 35, give the increased value of product per acre during the three years by reason of manure on plot No. 1.

The product of No. 5, where there was no manure applied, is deducted from the product of No. 1, where manure was ploughed in deeply. Both plots being treated precisely alike, except in the application of manure, the surplus product in No. 1 must be due to the manure. The money value is obtained through the following estimation.

Corn in the ear is valued at	$0.01	per lb.
Shelled corn, ...	.013	"
Wheat, ...	.025	"
Barley and oats, ...	.015	"
Hay and large potatoes, ...	.005	"
Mangolds, carrots and small potatoes, . .	.0035	"
Corn stover and straw, indiscriminately, .	.0025	"
Tobacco, ...	.10	"
Ground bone, ...	.015	"
Super-phosphate of lime, ...	.025	"

The lower figures in each division of the 35th column give the increased value of product for each cord of manure applied, on plot No. 1, or, in other words, they show the value of the manure per cord. Column 36 gives the items as in 35, as they apply to the plots numbered 2, where the manure was ploughed into half the depth of No. 1. No. 37 shows the same in regard to the plots numbered 3, where the manure was harrowed in. Column 38 exhibits the same concerning plots No. 4, where the manure was left on the surface.

We are aware that the money values which have been chosen, are all more or less open to objection, according to the locality from which they are viewed. This, however, is necessarily the case with any scale of values, and therefore we have selected a mean, as applying to the farmer who consumes the greater part of his own products, and does not value his crops by the fluctuating prices of distant markets. [See table commencing on page 46.]

We do not propose to comment at any length on the results exhibited by the table. They are exceedingly interesting and suggestive, and will bear a good deal of study. It will be seen that the particular points for which the experiments were instituted are pretty strongly brought out, considering the few experimenters engaged. We find that taking the three years together, deep ploughing was the most remunerative in Nos. 8 and 14. The first was a light, leachy, and the last a retentive soil. On closer examination we see that in No. 8 there was a regularly diminished product, as the manure was applied superficially, while in No. 14 the manure harrowed in gave the next largest product, surface application the next, and medium depth the least, suggesting the idea that there might have been some extraneous influence in operation, aside from the depth, or perhaps an unperceivable unevenness in the quality of the several plots, giving to No. 1 an undue advantage.

Those which gave the greatest product from manure at a medium depth, were Nos. 1, 2, 4, 5, 10 and 12. Nos. 1, 2, 4, 10 and 12 were retentive soils, and No. 5 a light one. Those which gave the largest result from manure harrowed in, were Nos. 3, 6, 9 and 11. Nos. 3, 9 and 11 were retentive, and No. 6 a leachy soil. Those which gave the best result from manure applied on the surface, were Nos. 7 and 13. No. 7 is described simply as a yellow loam, but from information otherwise obtained, we learn that it should be classed with the moist and retentive soils. No. 13 was retentive.

Adding the numbers together, we find that manure buried deeply gave the best returns in two instances; placed at a medium depth, in six; when harrowed in, in four; and when left on the surface, in two cases. Taking the retentive soils by themselves, deep ploughing of manure gave the greatest result in one case, shallow ploughing in five, harrowing in three, and surface application in two. The light soils yielded the best return from one of each of the several applications, except where applied on the surface.

In this computation we have omitted the second crop of hay in Nos. 2 and 14, that all might stand upon the same footing. The addition of the after-math in these cases would make the total product higher, but in No. 2 the relative result would not be altered, while in No. 14 the order would be changed from Nos. 1, 3, 4, 2 and 5, to 1, 3, 2, 4 and 5.

The average value of manure per cord, in all the experiments except No. 1, where guano was the only manure, was, on

Plot No. 1,	$4 16
No. 2,	4 64
No. 3,	4 78
No. 4,	3 76

No. of Experiment.	NAME AND RESIDENCE.	Amount of land in sq. rods.	Kind and quality of soil.	Crop and treatment previous to commencing the experiment.
1.	2.	3.	4.	5.
I.	Elihu Belden, Whately.	160	Medium, moist, retentive.	Tobacco in 1859 with 1,200 lbs. of guano and 300 lbs. super-phosphate.
II.	J. B. V. Coburn, Dracut.	200	Merrimack interval, moist and retentive.	Grass for 5 years.
III.	L. W. Curtis, Globe Village.	160	Moist, retentive.	Manured in 1858, mixed crops in 1859.
IV.	E. W. Gardner, Nantucket.	$37\frac{1}{5}$	Rich sandy loam, on clay and gravel subsoil, moist, retentive.	Grass 5 yrs. without manure. In 1859 after having 6 c'ds manure for turnips which failed.
V.	S. Leonard, Jr., Bridgewater.	60	Rather light, sandy subsoil, neither wet nor dry.	Grass for 6 years without manure.
VI.	John Patridge, Pittsfield.	400	Sand and gravelly loam, subsoil the same, dry and leachy.	Pasture for 20 years.
VII.	C. O. Perkins, Becket.	75	Yellow loam.	1859 sowed corn with 28 loads of manure.
VIII.	L. Stockbridge, North Hadley.	240	Light sandy loam, sandy subsoil, leachy.	Manured in 1857 for corn, in 1858 rye without manure, and grass since.
IX.	Albert Stratton, N. Leominster.	45	Rather heavy, moist, retentive.	Grass.
X.	Justus Tower, Lanesborough.	160	Clay loam, retentive.	Potatoes and corn in 1859, 7 1-2 cords green manure 6 inches deep.
XI.	B. P. Ware, Marblehead.	50	Dark loam, compact gravelly subsoil, retentive.	Grass for 10 years.
XII.	Josiah White, Petersham.	160	Heavy moist loam on clay subsoil, retentive.	1859, corn on sward with 8 cords green manure harrowed in.
XIII.	I. B. Woodward, Fitchburg.	20	Rather heavy black loam on clay subsoil, moist and retentive.	Potatoes in 1859 with about 3 cords of horse manure to the acre.
XIV.	W. G. Wyman, Fitchburg.	160	Heavy loam on clayey subsoil, moist and retentive.	Grass without manure for 3 years.

1860.

Manure, per acre, on the 4 plots, in cords.	Depth of first plowing, in inch's.	Time of Planting.	Kind of Seed.
6.	7.	8.	9.
1,565 pounds of guano.	12	Plants set from June 20 to 26.	Tobacco.
Compost, half loam, 12 cords.	8	May 17th.	Corn.
Stable and yard manure, 13⅛ cords.	8	–	Corn.
Horse, cow and hog manure, with a little peat muck, 16⅛ cords.	8	May 11th.	Corn.
7 1/12 cords.	7	–	Smutty White Corn.
6⅔ cords.	7	May 22d.	Small Yellow 8-rowed Corn.
10⅔ cords.	9	May 18th.	White Canada Corn.
Half green manure and half crude muck, 9⅑ cords.	8	May 18th.	8-rowed Yellow Corn.
Barn manure, 10⅓ cords.	7 to 8	May 25th.	Corn.
Horse stable manure, 10 cords.	8	May 12th.	Corn.
Peat mud, sea and stable manure, equal parts, 9 cords.	8	April 18th.	Jackson White Potatoes.
Green barn cellar manure, 15 cords.	8	May 17th.	Small Canada Corn.
Green barn manure, 11⅔ cords.	11	May 9th.	Corn.
5 cords barn manure and 500 pounds ground bone, 250 pounds superphosphate.	7	May 23d.	Yellow Corn.

No. of Experiment.	WEATHER—1860.				
	May.	June.	July.	August.	September.
1.	10.	11.	12.	13.	14.
I.	Dry.	Moist.	Moist.	Wet.	–
	Moist.	Dry.	Dry.	Moist.	–
	Moist.	Moist.	Moist.	Dry.	–
II.	Dry.	Moist.	Moist.	Dry.	Moist.
	Dry.	Moist.	Moist.	Moist.	Wet.
	Dry.	Moist.	Moist.	Dry.	Wet.
III.	Dry.	Wet.	Wet.	Wet.	Moist.
	Dry.	Wet.	Moist.	Wet.	Wet.
	Wet.	Wet.	Moist.	Wet.	Wet.
IV.	Dry.	Dry.	Dry.	Dry.	Dry.
	Dry.	Dry.	Dry.	Moist.	Dry.
	Dry.	Dry.	Dry.	Dry.	Moist.
V.	Dry.	Moist.	Moist.	Moist.	Dry.
	Dry.	Dry.	Dry.	Moist.	Moist.
	Dry.	Dry.	Wet.	Moist.	Moist.
VI.	Dry.	Moist.	Moist.	Moist.	Moist.
	Dry.	Dry.	Moist.	Wet.	Moist.
	Moist.	Dry.	Moist.	Wet.	Wet.
VII.	Dry.	Wet.	Moist and Cold.	Moist and Cold.	Moist and Cold.
	Moist.	Dry and Hot.	Moist and Cold.	Moist and Cold.	Moist and Warm.
	Moist.	Wet and Cold.	Moist and Cold.	Moist and Cold.	Dry.
VIII.	Moist.	Moist.	Wet.	Wet.	Dry.
	Dry.	Moist.	Moist.	Moist.	Moist.
	Dry.	Moist.	Wet.	Dry.	Moist.
IX.	Dry.	Wet.	Wet.	Moist.	Moist.
	Very Dry.	Moist.	Moist.	Wet.	Wet.
	Moist.	Moist.	Wet.	Moist.	Wet.
X.	Dry.	Dry.	Moist.	Wet.	Moist.
	Dry.	Wet.	Moist.	Wet.	Wet.
	Wet.	Moist.	Wet.	Wet.	Wet.
XI.	Dry.	Moist.	Wet.	Moist.	Wet.
	Very Dry.	Moist.	Wet.	Moist.	Moist.
	Moist.	Moist.	Moist.	Wet.	Wet.
XII.	Dry.	Wet.	Moist.	Moist.	Wet.
	Dry.	Moist.	Wet.	Wet.	Wet.
	Moist.	Wet.	Moist.	Wet.	Moist.
XIII.	–	–	–	–	–
	–	–	–	–	–
	–	–	–	–	–
XIV.	Dry.	Wet.	Very Wet.	Moist.	Moist.
	Very Dry.	Moist.	Wet.	Wet.	Wet.
	Moist.	Wet.	Wet.	Moist.	Wet.

1860.

Condition of Crop when Weighed.	Amount of Product, per acre, in pounds.				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
15.	16.	17.	18.	19.	20.
Harvested 3d to 7th of September,	1,710	2,160	2,005	2,005	1,275
Corn shelled, ...	3,200	5,276	5,348	4,648	1,204
Stover, ...	3,920	5,920	6,560	5,440	1,920
Total Corn, ...	4,230	4,910	5,110	4,560	2,435
Soft Corn, ...	510	410	390	605	1,025
Stover, ...	5,775	6,325	5,995	6,375	3,525
Corn in the ear, ...	4,131	4,775	3,528	3,141	860
Stover, ...	5,141	5,077	4,066	4,023	1,764
Corn in the ear, ...	5,103	5,427	4,290	4,286	3,126
Stover, ...	4,613	4,400	3,653	3,093	1,813
Corn, ...	1,928	2,504	3,080	2,144	1,720
Stover, ...	2,136	2,992	3,376	2,464	2,264
Corn in the ear, ...	1,931	2,347	2,496	2,869	1,760
Stover, ...	2,368	2,795	2,379	3,659	2,016
Corn dry and shelled, ...	2,400	2,050	2,020	1,697	1,407
Stover, ...	3,133	3,000	2,533	1,813	2,467
Corn in the ear, ...	2,222	3,556	3,609	2,756	1,067
Stover, ...	2,489	3,733	3,822	2,933	1,156
Corn in the ear, ...	4,290	4,755	4,515	3,795	3,360
Stover, ...	4,000	3,640	3,460	3,200	2,550
Large Potatoes, ...	11,200	12,752	10,160	11,040	9,280
Small Potatoes, ...	4,672	5,552	4,880	5,712	3,440
Corn in the ear, ...	3,380	3,770	3,860	2,625	1,900
Stover, ...	1,750	2,180	2,450	1,800	1,200
	Fail-	ure	from	Wor	ms.
Total Corn in the ear, ...	4,450	4,055	4,365	4,200	2,015
Soft Corn, ...	55	130	110	105	270
Stover, ...	5,500	5,170	5,460	4,770	1,770

No. of Experiment.	Depth of ploughing in inches.	Kind of Crop.	1861.				
			Product, per acre, in pounds.				
			No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
1.	21.	22.	23.	24.	25.	26.	27.
I.	Repeated ploughing of 1860 in all respects.	Tobacco, .	1,680	1,715	1,755	1,685	625
II.	–	Wheat, . .	1,092	1,232	1,120	1,344	560
		Straw, . .	1,920	2,400	2,080	2,600	1,000
III.	–	Barley, . .	1,720	2,040	2,480	2,545	1,040
		Straw, . .	800	830	1,000	1,030	700
IV.	8 inches.	Wheat, . .	699	602	731	495	301
		Straw, . .	1,108	1,527	2,216	1,947	409
V.	7 inches.	Barley, . .	620	707	653	627	393
		Straw, . .	840	1,000	853	853	520
VI.	7 or 8 inch.	Oats, . .	2,032	1,912	2,216	2,016	1,592
		Straw, . .	2,792	2,400	2,920	2,520	2,112
VII.	6 inches.	Barley, . .	859	1,035	1,088	1,056	789
		Straw, . .	821	1,003	981	939	667
VIII.	8 inches.	Wheat, . .	911	912	912	971	721
		Straw, . .	870	720	790	800	730
IX.	7 inches.	Oats, . .	960	924	889	933	782
		Straw, . .	2,044	1,883	1,849	1,967	1,618
X.	10 inches.	Oats, . .	2,092	1,937	1,650	1,521	1,235
		Straw, . .	3,375	3,205	2,550	2,300	1,950
XI.	8 inches.	Orange Globe Mangolds,	50,720	50,560	51,200	44,960	33,760
XII.	9 inches.	Barley, . .	2,330	2,420	2,320	1,960	1,700
		Straw, . .	3,270	3,855	3,830	2,910	2,275
XIII.	7 inches.	Wheat, . .	1,315	1,105	1,235	1,195	935
		Straw, . .	1,857	1,575	1,787	1,582	1,265
XIV.	6 to 7 inch.	Wheat, . .	1,015	850	960	915	310
		Straw, . .	2,330	2,015	2,215	2,515	1,275

Kind of Crop.	1862.				
	Product per acre in pounds.				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
28.	29.	30.	31.	32.	33.
Wheat,	1,567	1,282	1,246	Injured by freshet. 988	953
Straw,	2,665	2,180	2,145	1,945	1,915
Hay,	6,720	6,880	5,440	5,600	2,400
Second crop,	3,040	3,360	2,720	2,400	–
Hay,	3,680	3,840	4,160	4,000	1,920
Hay,	4,410	4,302	5,378	3,012	2,581
Hay,	2,000	2,293	3,327	2,333	1,173
Hay,	2,096	2,184	2,384	2,240	832
Hay,	4,437	4,704	5,323	5,109	4,139
Hay,	2,750	2,313	2,143	1,813	1,623
Hay,	5,120	Partly winter killed. 4,782	5,973	6,133	4,587
Hay, ploughed 8 inches before seeding,	3,230	3,625	2,950	2,550	1,600
Carrots, without manure,	43,440	42,560	47,200	43,040	44,080
Hay,	5,850	6,025	5,500	5,350	4,900
Hay,	5,200	5,400	5,460	5,840	3,540
Hay,	5,815	5,530	5,195	5,005	1,790
Second crop,	2,840	3,735	3,265	2,010	365

No. of Experiment.	Total Increase, and also the Increase per cord, of crops per acre, for three years, by reason of manure, according to the valuation on page 44.				
		No. 1.	No. 2.	No. 3.	No. 4.
1.	34.	35.	36.	37.	38.
I.	Total, ...	$178 62	$218 88	$206 49	$190 32
	Value of guano per ton, .	114 12	139 84	125 52	121 60
II.	Total without 2d crop of hay,	68 15	105 64	97 37	93 17
	Per cord, ...	5 68	8 80	8 11	7 76
III.	Total, ...	42 82	56 67	66 47	62 17
	Per cord, ...	3 26	4 32	5 06	4 74
IV.	Total, ...	64 99	66 35	61 63	39 30
	Per cord, ...	4 03	4 11	3 82	2 44
V.	Total, ...	3 10	40 99	31 44	24 94
	Per cord, ...	4 96	5 79	4 44	3 52
VI.	Total, ...	16 38	21 44	35 52	19 16
	Per cord, ...	2 46	3 22	5 33	2 87
VII.	Total, ...	5 51	15 17	19 45	24 73
	Per cord, ...	52	1 42	1 82	2 32
VIII.	Total, ...	25 30	17 89	15 65	9 51
	Per cord, ...	2 78	1 96	1 72	1 04
IX.	Total, ...	21 28	35 09	41 09	32 39
	Per cord, ...	2 06	3 40	3 98	3 13
X.	Total, ...	37 49	40 46	28 59	15 86
	Per cord, ...	3 75	4 05	2 86	1 59
XI.	Total, ...	71 03	78 23	81 40	52 66
	Per cord, ...	7 89	8 69	9 01	5 85
XII.	Total, ...	32 86	41 52	38 91	16 56
	Per cord, ...	2 19	2 77	2 59	1 10
XIII.	Total, ...	27 58	23 62	28 00	30 29
	Per cord, ...	2 36	2 02	2 40	2 59
XIV.	Total without 2d crop of hay,	74 05	62 95	68 42	63 64
	Per cord, ...	12 06	9 81	10 93	9 98

The average value of manure per cord on the retentive soils, was, on

Plot No. 1,	$4 38
No. 2,	4 94
No. 3,	5 06
No. 4,	4 15

On the light soils, the average was, on

Plot No. 1,	$3 40
No. 2,	3 66
No. 3,	3 83
No. 4,	2 48

It will be observed that all the weather returns of 1860, except No. 4, indicate a very moist season through the growing months of June, July and August. This would undoubtedly cause the product to be larger from plots Nos. 3 and 4, where the manure was harrowed in and left on the surface, than the average of seasons, and much more than in a dry season.

The result, then, of these experiments, taken as a whole, seems to us to point out this important rule: that the most profitable mode of applying manures from the barn or stable, is by harrowing them in, unless we have a light soil, in which case they may be ploughed in to a very slight depth. It is however to be observed that these experiments are as yet inconclusive, mainly from the paucity of their number. The other two series already in operation, and a new one to be commenced in 1863, in response to the requirements of this Board, must be relied on to give value to any conclusions which are here only indicated.

There are many interesting points that we should be glad to touch upon, but they will suggest themselves to any one upon a careful examination of the table. We wish, however, to call attention to one or two matters which are found in the statements, but do not appear in the table. In experiments numbered 11 and 14, there was a sixth plot added, for different purposes in the two cases, and which will be found very instructive, if traced through the three years. It may be proper to mention that in No. 1 there seems to have been a misconstruction of the directions, inasmuch as the manure and ploughing of 1860 was repeated in 1861. The experiment aside from this, however, is very interesting, and gives to guano a very high value for both tobacco and wheat.

There is one important matter which this table pretty distinctly points out, and that is, that manure, applied in either of the modes prescribed, has a value, and in some of them a very great value. This is shown to exist even though the experiments have covered a period of only three years, and of that, only one crop of grass is taken into the account. There is another influence which diminishes the apparent value of the manure in some of the cases. We find that where the land had been manured within a year or two previous to commencing the experiment, the value of the manure was less per cord, simply because No. 5, in such cases, gave a larger product than where the land had lain in grass or pasture for some years without manure. One peculiar case occurs in No. 11, in which the rotation was potatoes, mangolds and carrots. The unmanured plot, or No. 5, gave more carrots than either of the others, except No. 3, where there was a slight increase. This exceptional case will not, however, detract from the general result, from which we derive evidence that if there is profit in farming at all, much of it depends upon the ability of the farmer to save, make, or otherwise command, a full supply of manure. Manure, we may reasonably conclude, in some way renders soil fertile, and increases its power of producing valuable crops, either by acting directly as food, or in some indirect manner, supplying nourishment to plants.

There are two opinions entertained by scientific agriculturists of the age, concerning the precise condition of the nourishment imbibed from the soil. One class, analyzing the soil, and finding in it, in all cases accompanied with fertility, certain substances which are products of the decay of vegetable matter, which exist either alone or in combination, as acids with bases, and in these different conditions, having varying degrees of solubility, infer that these compounds are taken up by the roots of plants, and carried into the circulation, there to be acted upon by the power of the vital processes, and transformed into the substance of the plant or some of its products. Another class proceed by analyzing the plant, and finding that the great bulk of its structure is made up ultimately of carbon, combined with the elements of water, i. e., oxygen and hydrogen, and also in view of the fact that plants give off oxygen largely during active growth, infer that carbonic acid, which is a compound of carbon and oxygen, when dissolved in water, is absorbed *as* carbonic acid by the roots, and constitutes the principal portion of the nutrient material accessible to the plant. Both classes agree in this, that when ultimate decay takes place in the organic matter of the soil, carbonic acid and water are the principal products, with ammonia in some cases. Nature has in her vital domain many niches which the curious chemist is forbidden to enter, and into which the physiologist can only obtain an occasional and partial glance.

We find on examination, that we are able out of these two opinions to deduce an important practical fact. If the theory first stated be acknowledged, then it follows that the larger the quantity of vegetable matter a soil contains, other things being equal, the greater will be its productive capacity. In the other case, the greater the amount of carbonic acid that the soil possesses, other things being equal, the greater its productive capacity as before, and inasmuch as the cheapest, best and most constant source of carbonic acid is to be found in the gradual decay of vegetable matter, then the more of such material present in the soil, as in the first case, the larger the results attainable by the agriculturist. It has been asserted, it is true, that soil entirely deficient in humus, as this vegetable matter is more commonly called, may be made to produce remunerative crops; but facts are wanting to sustain the assertion, while the experience of the agricultural community goes to contradict it. It is true that the amount of a crop does not bear by any means a direct relation to the amount of vegetable matter in a soil. The *condition* of that vegetable matter has much to do with it; as for instance, peat or muck, which may be entirely made up of vegetable substances, will not afford nourishment to plants until its crude condition is altered, its acids neutralized, and its surplus water removed. Again, a surplus of vegetable matter, such as sometimes accumulates in long cultivated and highly manured gardens, will not grow a remunerative crop in consequence of a deficiency of inorganic substances, which, though required in but small quantities, yet are as essential to the structure of most plants, as is the carbon, hydrogen and oxygen of the humus.

We think we may assume that the man who provides for his lands the largest amount of decaying vegetable matters, will thereby be possessed of a capacity to grow the largest crops with the least outlay. It does not follow that he will necessarily grow them, for that depends upon other considerations. One individual may have a large brain and great *capacity* for the exercise of mental power, but from a phlegmatic temperament be incapable of arousing himself to the effort; while the man with a small brain, coupled with an active, energetic temperament, may thereby completely eclipse the former, not only apparently, but really. Quite as much depends upon the quality and condition of this vegetable matter, as upon its mere bulk, especially for the production of rapid results, generally the more profitable ones. As in the instance of the man with a large brain, we say he has great natural powers or capacity, so of a soil containing a large proportion of organic matter, we say of it that it is naturally capable of yielding large crops, under proper treatment.

There are various sources from which we derive vegetable matter, to be used as manure, but the most important one to the farmer is that which is yielded by farm animals. The food of these animals consists mainly of grass, either green or in the form of hay, with some grain, and water for drink. Out of these substances is manufactured by the animal, either growth, milk, fat, or the ability to labor, or in other words, the power of keeping its organization in condition, by supplying the waste constantly going on in organized beings. Hay or grass, which constitutes the principal bulk of the food, unlike grain and all those concentrated substances consumed by man, is made up in great part of what is called woody fibre; a substance which is digestible only in very trifling degree, and passes through the alimentary system of the animal. During this passage, it becomes finely divided, softened, and the greater part of its soluble constituents, such as albumen, gum, starch, sugar, &c., dissolved out. It is these soluble portions that enter the circulation of the animal as nutriment, while the remaining woody fibre is discharged, mixed with some excrementitious products. The condition of this woody fibre is found on examination to be much changed. As long as kept in the mow in a dry condition, hay is not disposed to undergo any change, but by its division, and the accession of heat and moisture, the solution of parts of its substance, and especially, by the addition to it of the aforementioned excretory substances during its passage through the animal, it is prone to decay. It passes through the stages of decay rapidly, as compared with undigested hay, even when the conditions of moisture and warmth are supplied out of the body.

This vegetable fibre which makes up the principal bulk of the manure, in its subsequent decay, assumes a form in which it is called mould, humus or geine, each name being often used indiscriminately to designate it. In this condition it is an exceedingly complex substance, being made up of a number of different bodies, possessing varying properties. Some of them are acids, showing a strong affinity for bases, and by their union with these bases forming salts, having varying degrees of solubility. Whether it is in this form that they are taken up, dissolved in the sap of plants, or whether they go through a further decomposition in the soil and become carbonates of the same bases, or whether the ultimate spongiole has the power to effect a transformation at the moment of absorption, are questions not as yet determined ; but the great fact to be remembered is, that vegetable fibre, during its decay, forms humus, and by means of the presence of this humus in the soil, plants are enabled to exist and increase their substance. It should not be inferred from this statement that humus, composed of woody fibre alone, is capable of completely nourishing a plant. Pure woody fibre contains simply the elements of woody fibre, and not those of other constituents of the plant. Nor does woody fibre derived from the pine furnish all the elements found in the composition of that of the oak. The ultimate constituents of woody fibre are the same in all cases, being carbon, hydrogen, and oxygen ; but there are other substances found in intimate relation and combination therewith, and especially the inorganic matters left in the ash when the fibre is burned.

A manure cannot give to a plant that which it does not in itself possess. One composed exclusively of carbon, hydrogen and oxygen, in the form of humus, cannot furnish of itself complete nourishment to a plant having a composition containing any other element than these; but humus, or rather some of the compounds which are included in that term, undoubtedly have the power of combination with other substances in the soil, and perhaps that of liberating elements otherwise locked up within it. Thus a simple form of woody fibre in the condition of humus, may yield nourishment to a plant having a more complex or higher form of woody fibre. That such is the case we think probable from the fact that an artificial soil, containing but a trifling amount of organic matter, supports at first plants of an inferior type; these by their decay produce a more abundant supply and a higher form of humus, and the next race of plants are of a superior class; and this action goes on until a natural limit is reached. Pure woody fibre, divested of every thing but its essential composition, is the same in all circumstances, and it differs only in the quantity and variety of the additional elements united or combined with it. The higher the type of the plant from which it is derived the more value does it possess as a manure for plants of a correspondingly elevated composition. Thus a ton of manure, the product of a comparatively low form of vegetation, such as swale hay, has much less value for manurial purposes than a ton produced from Timothy.

We cannot therefore always judge correctly of the value of a manure simply by measuring its bulk, but we must know the materials out of which it is made. It is a fallacious idea that, by composting manure with loam, or any other substance, we thereby increase the elements of that manure. It is merely a dilution. The different qualities of muck are without doubt dependent for their value almost entirely upon the composition of the materials out of which they are formed. Muck is a form of humus from decayed vegetable fibre, produced without the intervention of animal life. If it has its source in a low or simple type of vegetation, it will be found to have much less value as a manure than if it had been derived from a more elevated or complex one. It is probably true that any plants, or class of plants, are best nourished through the decay of similar ones of a previous existence, for the reason that precisely the same elements, in kind and quantity, are set at liberty by the decaying that are required to build up the structure of the growing one.

We are thus naturally led back to the original woody fibre, or hay, and thence springs up the natural query, if grass is the best manure for grass lands, why not use that substance directly as a manure? The answer is simply this: If we do, our cattle must starve; and, if we carry the same principle through all our crops, we must also starve. Nature has not formed her plans in a way to render such a course necessary. If such had been the case—if no vegetation could have occurred in kind and amount, except through the decay of the same amount of previous vegetation, animal life would have been an impossibility, and the amount of vegetable matter at the time of the original creation would have been the limit ever after.

It is a pretty generally acknowledged fact, that if all the hay which grows upon a given piece of land be fed to an animal, and the manurial product saved and applied to the land again, the latter will thereby acquire the capacity to produce an increased crop, notwithstanding much of the substance of the hay shall be appropriated by the animal which does not appear to find its way back to the soil. This apparent loss is less real, however, than at first sight appears. Of the matters derived from the hay which go to nourish the animal, starch, gum and sugar, are composed of the same elements as woody fibre, in slightly different proportions; so that the loss here is only one of quantity. In the composition of albumen, and other substances of this class, we find a new element, called nitrogen. This is an indispensable element in animal and nearly if not all vegetable structure, but not found in woody fibre. What becomes of it? It is taken into the circulation of the animal, and enters into the structure of most parts of the body, with the notable exception of the fat. Let us trace it a little farther. Nearly all the secretions contain it. It is found in milk. If milk is sold from the farm, so much of it is lost. If cheese is disposed of, this carries it off. If butter is the product, then the nitrogen is left in the skim-milk. This skim-milk goes to feed swine. It enters their system and is appropriated in building up their structure. If the resulting pork is consumed on the farm, there is no loss, but if otherwise disposed of, it is parted with.

Besides the secretion of milk there is that of the urine. This does not leave the farm except through the negligence of the proprietor in taking the necessary means to save it. This substance contains nitrogen in large proportion. An animal takes a considerable amount of nitrogen in its food daily, and unless growing rapidly, or giving milk, must necessarily eliminate it in some other way. Every movement of the body, in any of its parts, involves a waste of the materials making up its structure, and this waste or effete material is taken up by the circulation and excreted from the system, while its place is supplied by a new portion, derived from the food. The greater part of this excretion takes place through the kidneys, though the solid manure also contains it. Then if the animal is eventually consumed on the farm, it is evident that there need be but very little loss of nitrogen; and even if the animal is sold, the amount of nitrogen in its composition at any one time bears but an extremely small proportion to the total amount that has been consumed and excreted by it during life.

What is true of nitrogen, is true to a greater or less extent of all the salts and inorganic matters generally, found in the food and in the body of the animal. If all of them could be carefully treasured and returned to the land, a farm would necessarily and constantly improve in its producing capacity. We have seen, however, from the nature of the case, that this is not always practicable, nor does nature demand it, even if it could be done. The soil itself contains an inexhaustible store of inorganic matters, which are constantly becoming available in quantities sufficient to produce moderate crops. To exceed that amount we must add to the soil some of those substances which we have shown to exist in manure, and if we fail to save them we are under the necessity of purchasing from foreign sources. It is quite possible to return to the soil the whole of the woody fibre, inasmuch as it is all contained in the solid evacuation of the animal; and we can give back all the other elements of the plant, except those portions carried off in the milk, or eventually in the bodies of the animals themselves, by saving and applying all the urine. We venture the assertion, that a farmer, saving all the manure, liquid and solid, made by his stock, and judiciously applying it, can raise constantly increasing crops up to the capacity of his lands, without the purchase of extraneous manures. But if he is selling constantly, or from time to time, constituents that he does not return to his land in kind or quantity, and that the atmosphere and soil cannot furnish in sufficient amount to grow satisfactory crops, then purchase of foreign substances containing them in available form is necessary to keep up the productiveness of the soil.

Manures may be practically divided into three great classes, known as carbonaceous, ammoniacal, and inorganic. The first is made up almost exclusively of woody fibre. Its great source is the manure from our farm animals. Deposits of peat and muck are referable to this class. They all form, in their progress toward ultimate decay, under favorable circumstances, what we denominate humus. Ammoniacal manures are those which contain nitrogen in their composition, and which by its union with hydrogen forms ammonia during progress toward decay. The principal available source of this substance is the liquid evacuations of stock. It is contained in the solid manure to some extent when fresh, and also in most other animal products except fat, such as hair, wool, horns, hide, flesh, blood, &c. The inorganic matters are all derived originally from the inorganic substances composing the soil. The more important ones are lime, potash, and phosphoric acid. These substances exist in nearly every soil, but in such combinations that they are only very slowly available to vegetation, but they are nevertheless, just as absolutely necessary to plants as humus or ammonia. Their ordinary source is in ashes and bones. It is evident that an ox, whose bones are made up in large proportion of lime and phosphoric acid, in combination as phosphate of lime, could never have attained his growth had not his food contained those substances. If that food, which is hay and grain, possessed them, they must have derived them from the soil. If these elements had not existed in the soil, then the hay and grain could not have been developed from it.

These considerations teach us that we must be sure that the soil is furnished with *all* the substances needed to grow crops, if we would get maximum results. A soil filled to repletion with humus, but having no available phosphate of lime, or potash, cannot by any possibility grow a crop in the composition of which they are indispensable. Neither can a soil holding large amounts of inorganic matters, produce a crop without some form of carbonaceous material. Ammonia is found in the atmosphere in very small quantities, and in the opinion of some scientific men, in sufficient quantities for profitable growth, if all the other conditions are present. We believe, however, that no man can afford to allow the elements of ammonia produced on his own farm to run to waste, certainly not if he can afford to purchase guano for its ammonia.

A few words on the best means of furnishing these different substances to the soil, and we leave the subject. All carbonaceous matters produced upon the farm should eventually find their way into the soil. Those which are not used as food for animals, should be applied to the soil through the medium of the compost heap, or directly, in order to promote their decay. All which have gone through the process of digestion should be carefully saved without loss, until applied to the land. To do this effectually, it must be kept under cover until applied, as every rain dissolves out more or less of its immediately available portions. To prevent it from heating, which liberates ammonia, and if carried far enough burns it up by "fire fanging," it may be worked over and trodden by swine, or it may be kept moist by throwing upon it frequently a sufficient quantity of water, or its own liquid drainage. The best method, in the opinion of the committee, is, to receive it in a water-tight receptacle underneath the animals, where it is submerged in the liquid evacuations, to which water may be added if necessary. In this condition it does not undergo decomposition to any extent, but remains without loss until wanted for use.

This latter method is also the preferable one for saving the ammoniacal portions of the manure, as to retain them otherwise, we are obliged to mix them with some absorbent. This is a somewhat expensive and not very effective mode, but is *much* better than none.

If then, by any plan, we have saved all the carbonaceous manure, which is quite possible, together with a very large portion of the ammoniacal, which is also possible, as both of them are to be found in the evacuations, we lack only the inorganic matters necessary to grow crops. These we must seek for principally in ashes and bones. Every spoonful of wood ashes made on the premises, and every bone from the table, or otherwise available, and all carcasses of animals dying, or other animal refuse, should be scrupulously saved. If this is all done, and the best use is afterward made of these substances, to which end the foregoing tabulated experiments may furnish some guide, there will be but little need of purchasing manures from abroad, but our farms will constantly increase in their capacity until the extreme limit of productiveness is reached—a condition of things for which we should not cease striving, although we may never be able to attain it.

Jabez Fisher,
John Brooks,
Henry Chapin,
Committee.

CULTURE OF TOBACCO AS AN AGRICULTURAL PRODUCT.

The committee appointed to consider the Culture of Tobacco as an agricultural product, submitted the following Report:—

The committee appointed by the Board of Agriculture to report on the history and cultivation of tobacco, do not propose to treat on the morality of its uses, or the good or ill effects of its cultivation, but will attempt to give some account of its origin and introduction into different parts of the world, and also more particularly to describe the mode of cultivation, and process of curing and packing in the Connecticut Valley.

Whatever may be thought of its offensive qualities, or its pernicious tendencies, it must be acknowledged that it is one of the most remarkable productions of nature, as within about three hundred years it has gained an uncontrollable influence in every part of the world, enlightened and unenlightened, Christian and pagan. Kings have forbidden it; popes have excommunicated it with curses, and physicians have warned against it. Even ministers of the gospel have lifted up their voices and thundered their denunciations from the pulpit; but all has been in vain; its growth and use have increased, and still continue to increase, and will hereafter increase as long as the earth continues to yield this most remarkable plant, the use of which has perverted the appetite of man.

A writer who has exhibited great research in preparing an article on tobacco, its first introduction, and its early history, says, it is not certainly known whether it grew spontaneously in Virginia, or whether it came originally from some more southern region of America. At all events, the English who first visited Virginia certainly found it there, and Harriot was of the opinion that it was of spontaneous growth. Mr. Jefferson thought it was a native of a more southern climate and handed along the continent from one nation of savages to another. Dr. Robertson has informed us, that it was not till the year 1616 that its cultivation was commenced in Virginia.

However this may be, the gallant and unfortunate Sir Walter Raleigh has the credit of bringing it into fashion in England. It is well known that the colony planted in Virginia by Sir Walter, suffered many calamities; and we are told that Ralph Lane, one of the survivors who was carried back to England by Sir Francis Drake, was the person who first made tobacco known in Great Britain. This was in the twenty-eighth year of Queen Elizabeth, A. D. 1585. Sir Walter is said to have been very fond of smoking, and humorous stories have been recorded concerning it, particularly of a wager made with Queen Elizabeth, that he would determine exactly the weight of the smoke which went off in a pipe of tobacco. This he did by first weighing the tobacco which was to be smoked, and then carefully preserving and weighing the ashes; and the queen paid the wager cheerfully, being satisfied that what was wanting to the prime weight must have been evaporated in smoke. Every one remembers the story of the alarm of one of Sir Walter's servants, who, coming into the room and seeing his master enveloped in smoke, supposed him to be on fire. It may be interesting to those who delight in smoking the weed, to know that a tobacco box and some pipes of Sir Walter's were deposited in the museum of Mr. Ralph Thorsby, of Leeds, Yorkshire, where they probably remain to this day.

We conclude our remarks upon Sir Walter, by quoting a poetical tribute to his memory:

Immortal Raleigh! were potatoes not,
  Could grateful Ireland e'er forget thy claim?
Were all thy proud historic deeds forgot,
  Which blend thy memory with Eliza's fame,
Could England's annals in oblivion rot,
  Tobacco would enshrine and consecrate thy name.

We cannot forbear to make a quotation concerning the Virginia colony, at a more flourishing subsequent period, which, as it records a historical fact, cannot fail to be interesting, though at this day it would appear very strange and comic. "The adventurers," (says Malte-Brun,) "who increased from year to year, were reduced in consequence of the scarcity of females, to import wives by order, as they imported merchandise. It is recorded that ninety girls, young and uncorrupted, came to the Virginia market in 1620, and sixty in 1621 ; all of whom found a ready sale. The price of each at first was one hundred pounds of tobacco, but afterwards rose to one hundred and fifty." The original cost is not stated.

In whatever way this weed found its way into Europe, it met with strong opposition. The crowned heads published edicts, imposed prohibitory duties, and issued penal laws against its introduction, supposed to amount to total prohibition ; but its use had become so firmly fixed on the appetites of the subjects, they fled to the mountains and hid themselves rather than forego the pleasure of smoking.

We copy from an ancient document the following brief sketches, viz. : In 1624, Pope Urban Eighth anathematized all snuff-takers who committed the heinous sin of taking a pinch in church ; and so late as 1690, Innocent Twelfth excommunicated all who indulged in the same vice in St. Peter's church at Rome. In 1625, Amurath Fourth prohibited smoking as an unnatural and irreligious custom, under pain of death. In Constantinople, where the custom now is universal, smoking was thought to be so ridiculous and hurtful, that the Turk who was caught in the act, was conducted in ridicule through the streets, with a pipe thrust through his nose. In Russia, where the peasantry now smoke all day long, the Grand Duke of Moscow prohibited the entrance of tobacco into his dominions, under the penalty of the knout for the first offence, and death for the second ; and the Muscovite who was found snuffing was condemned to have his nostrils split.

We will turn to our subject. We have said the growth and consumption of tobacco was increasing, and that it would continue to increase. We have no proof of the latter, except to look and see how enormously it has gained for the last ten years. The product in the United (and seceding) States and

Territories, in 1849, was 199,752,655 pounds. In the year 1859 it reached the astonishing amount of 429,390,771 pounds, being a gain of 229,638,116 pounds in ten years. The crop grown in 1859, at the low figure of ten cents per pound, would amount to $42,939,077.10. Notwithstanding the great amount grown here, we find that large quantities are imported every year. Not being able to get the amount imported in 1859, we take that of 1858. In that year there was imported into this country 7,499,566 pounds, at a cost of $1,255,831. Also 218,729,000 cigars, at a cost of $4,123,208, and snuff, with other manufactures of tobacco, to the amount of $589,439. Of the domestic tobacco spoken of, there were exported 127,670 hogsheads, 4,841 cases and 12,640 bales, valued at $17,009,767, and of the manufactured domestic tobacco exported, there were 11,210,574 pounds, valued at $2,410,224.

By the census of 1840, all the tobacco grown in Massachusetts in 1839, amounted to only 64,955 pounds. In 1849 the amount was 138,246 pounds, all grown in four counties, viz.: Franklin, 14,590 pounds; Hampden, 68,156 pounds; Hampshire, 55,300 pounds; Middlesex, 200 pounds. In 1859, Massachusetts produced 3,223,198 pounds, being an increase of 3,084,952, the last ten years, and in twenty years 3,158,243 pounds. It is estimated that Massachusetts has produced this year (1862,) one-third more than 1859, which would make the amount 4,297,597 pounds. At fifteen cents per pound, (which is a low estimate for this year,) this crop would come to $644,639.55. Several of the northern States present a very large increase. Ohio raised in 1859, over twenty-five and one-half million pounds. New York increased her product the last ten years, from 83,189 pounds to 5,764,582 pounds. Connecticut increased from 1,267,624 to 6,000,133 pounds. In 1849 the loyal States produced 230,369,341 pounds, and the seceding States produced 199,021,430 pounds. The consumption of this article, in various forms, doubtless keeps pace with the production.

CULTIVATION.

First prepare a plant bed. Select a warm exposure of moist (not wet) ground, make it very rich, using manures free from weed or clover seeds, to avoid extra work when weeding plants. Prepare the ground early in the spring as possible, as you would a bed in the garden. Leave it flat on the surface for the convenience of watering in case of drought. Mix an even table-spoonful of seed for every rod of ground to be sown, with a sufficient quantity of gypsum, (or Indian meal will answer the purpose,) in order to see where it is sown that you may spread it even over the bed. Do not in any case cover the seed, but after sowing, tread, or roll it *hard*. The bed should then be covered with fine brush or a thin covering of straw, which may remain till the plants are up and need weeding. They will require two or three times weeding before they are large enough to set in the field. Many farmers are in too great a hurry to get their plants out ; they set them too early, and use too small plants. By letting them grow in the bed till they get a good root, and a good-sized leaf, they are maturing as fast or faster than if set in the field. As long as they can remain in the bed they are secure from the cut-worms which devour small plants. This causes much labor, by being obliged to reset, and gives an uneven crop. If the plants are large, say leaves four or five inches in length, the worm may eat some days, (or rather nights, for then is the time they do the mischief,) without injury, unless it takes out the centre bud. If that is gone the plant is worthless, and its place should be supplied with another. From the 15th to the 25th of June is early enough to set the field. If we could be sure of suitable weather we would never put out the plants earlier than the 25th. This plant requires strong, warm land, such as would produce forty bushels of corn per acre ; should be manured with at least ten cords of good manure with two hundred pounds of plaster sown on after it is spread. Plough and harrow two or three times in order to get the earth well pulverized and mixed with the manure. After harrowing smooth, mark the rows three and a half feet apart, and make the hills two feet four inches on the rows. They should be ready previous to the day of setting, so that in case of a wet time the work can be done with greater dispatch.

Sometimes, for the want of rain, we are obliged to water out the plants. This is done by pouring a little water on each hill, and set soon after. Run some fine hay or grass through a hay-cutter, and cover the plants, if there is danger of injury by too hot sun. Clean culture is necessary to the success of a good crop. The green worm first makes its appearance in the early part of July. The only way known to prevent its ravages is to go over the field three or four times a week and destroy it. The worms are more readily found in the morning than in the middle of the day. Let as many of the plants blossom as possible without forming seed. Then break off to a good leaf. There is more danger of breaking too high than too low.

Remove the suckers, and be sure they are all broken off just before cutting. It will be fit to harvest in two or three weeks after it is topped. When cut let it lie on the ground till it is wilted sufficient to handle without breaking the leaves, but by all means avoid too much exposure to a hot sun in the middle of the day as the heat will burn the leaf, and render it worthless, as if frost-bitten. When taken from the field, to the building for curing, it is passed from the load by one man to another, who hangs it by tying the twine around the first plant, and running it over the pole ; then with one turn of the twine, secures each of the plants till the pole is filled, then makes it fast. If the pole is twelve feet long, put from thirteen to fifteen plants on each side, and place the poles eighteen inches apart from centre to centre. For the first few days after it is housed, give it plenty of light and air to guard against sweat, which would cause great injury. When all danger from this source is past, keep the building closed, and let it hang till the stem of the leaf is well cured. It must then continue to hang till we get a damp, or rainy time that will moisten it sufficiently to make it soft and pliable. When it is in suitable condition, it is cut down by one, and passed to a second hand who takes and packs it down in a double row, tip to tip. When all down and packed it should be well covered with straw, or cornstalks, to prevent drying. Strip it out soon after it is taken down, and be careful it does not heat while in the pile. Sixteen to twenty hundred pounds is considered a fair yield. Make two qualities by putting the lower, and other poor leaves, in hands by themselves.

Two good plants will make a hand of the first quality. As fast as it is stripped the hands should be packed *close* and straight, in a pile, tip to tip. Leave the buts exposed to the air for a few days, when it will be in a suitable condition for casing. The cases are made three feet eight, to ten inches in length (depending on the length of the tobacco) and two and a half feet square, measuring the outside. They should be made of inch boards, and planed on the outside.

Press from three hundred and seventy-five, to four hundred pounds into each case, where it goes through a sweat, and in about one year after it is cased is in a suitable condition for the manufacturer to work, who uses it mostly in making cigars.

PAOLI LATHROP.
LEVI STOCKBRIDGE.

FRUIT CULTURE.

At a meeting of the State Board of Agriculture, on the 19th of February, 1861, a committee was appointed to *prepare a Catalogue of Fruits, adapted to the Commonwealth of Massachusetts, and with special reference to Nomenclature.* That committee was continued last year, on account of the failure of many kinds of fruits in 1861, and at the annual meeting in January, 1863, submitted the following Report:—

In accordance with the requisition of this Board, your committee submit the following catalogue of fruits, which they recommend as being well adapted to cultivation in the State of Massachusetts.

While it has been difficult to acquire information in regard to all the varieties of fruit which prosper in the different districts of the Commonwealth, sufficient knowledge has been obtained to warrant the belief that most, if not all of those named, possess characteristics which will render them permanently useful.

This catalogue is not presented as being complete or perfect, but simply as a beginning or basis to which future additions and improvements may be made. Neither is it deemed expedient to elaborate it beyond the immediate and practical benefit which may inure to our farmers by the cultivation of fruits.

Fruit culture has become an important appendage to the farm, and although the temperature and soils of New England have not been considered so propitious as some other portions of our country, yet it is believed, by your committee, that with judicious cultivation there are few if any of our States where success is more certain, or the result more profitable than in

Massachusetts. The consumption of fruits has become so common as to constitute one of the most important articles of daily food. The loss of a crop is now deemed as a great calamity, its abundance as one of the choicest blessings, adding largely to the social health and comfort, and to the commerce and wealth of the country. It is wise, therefore, for this Board to take under its special cognizance this department of husbandry, and to offer every encouragement for the further development of this interesting branch of industry.

Vicissitudes attend the cultivation of fruit trees as well as other vegetable products, and it is proper to record the fact in the Transactions of this Board, that owing to the injury sustained by the sudden and extreme fluctuations of temperature in the autumn of 1860, which arrested the ripening of the wood, and the revulsions of the winter of 1861, there was but little fruit throughout all the northern and middle States. In consequence of this extraordinary reverse, your committee were arrested in their investigations, and were unable to submit their report, as was anticipated, at the commencement of last year. But a kind Providence has brought about a restoration, so that the year 1862 has been as remarkable for the abundance and excellence of the fruit crop as that of 1861 for the loss of it.

The revulsion of 1861 is not, however, without its compensating advantages, serving as it does to illustrate the comparative hardiness and power of endurance in some varieties of the same species, and develop different degrees of susceptibility to injury in others. Thus we deduce the fact, that some varieties of the pear are even hardier than the apple. For instance, among the few sorts of pears which bore abundantly in 1861, were the Urbaniste, Louise bonne de Jersey, Vicar of Winkfield, and Belle Lucrative, while the apple and most other varieties of the pear failed of a crop. During the last quarter of a century the apple has failed repeatedly in the vicinity of Boston, but these varieties of the pear have borne fruit annually.

The different ability of trees to resist heat and cold is remarkable. Some are suited to one location, some to another; some are exceedingly capricious and sensitive, only suited for the collections of amateurs, while a very few flourish in a great variety of latitudes.

All these considerations teach us the importance of carefully observing and noting the numerous circumstances which modify results, and the constant demand for research, patience and perseverance by the cultivator of fruits.

In the subjoined list of fruits it has been the object of the committee to point out, as far as possible, the peculiar characteristics of certain varieties, and to exclude all such as are difficult of cultivation or of doubtful utility; and as another committee are charged with the duty of reporting on the grape, these investigations are confined to the apple and the pear. Your committee doubt not that there are other good varieties of these not enumerated in this catalogue, which are successfully grown in this State. Some of these may be especially adapted to certain districts. Local circumstances must therefore govern the fruit grower in the selection of varieties, and he should first look around his own region and plant such as are known to prosper in his immediate locality. Very much depends on the suitableness of the soil, and upon the care and culture which trees receive. To these we shall allude in the subsequent pages of this paper.

The arrangement of the varieties is alphabetical, according to the nomenclature adopted by the American Pomological Society. In regard to the latter, the committee have endeavored to reduce as much as possible the multiplicity of names given to varieties, and thus to prevent an accumulation which is of no practical advantage, and leads to confusion. Only a few synonyms are therefore given, and these follow the adopted name in *italics*. The limits of this report will not admit of giving descriptions of the fruits recommended, but simply to indicate the color, size, season, use, and a few remarks in regard to soil, habit of the tree, &c. In relation to the time of ripening, instead of naming the months in which the fruit matures, the general terms of summer, autumn and winter have been used.

The arrangement of the columns is as follows: first, the name of the variety; next, the color; then the size, season, use, &c.

APPLES.

The abbreviations are : SEASON.—S, summer; A, autumn; W, winter; E, early; L, late. Those not designated as early or late may be regarded as ripening midway of the seasons. COLOR.—r, red; y, yellow; st, striped; g, green; rus, russet. SIZE.—l, large; m, medium; s, small. USE.—K stands for kitchen or culinary purposes. All others are dessert kinds for the table. M designates those most popular for market.

	Color.	Size.	Season.	Use.	REMARKS.
Astrachan Red,	r.	m.	S.	K. M.	Ripens in succession ; very productive on alternate years ; requires thinning.
Baldwin,	r.	l.	W.	M.	American. The most popular of New England ; valuable for exportation.
Bellflower Yellow,	y.	l.	E. W.	M.	
Benoni,	r.	m.	E. A.	–	American. Requires a warm, silicious soil.
Blue Pearmain,	r.	l.	W.	K.	Very hardy ; second quality ; season same as Hubbardston.
Coggswell,	st.	l.	L. A.	M.	American. Popular in Connecticut as a market variety ; hardy.
Danvers Winter Sweet,	y.	m.	W.	K.	American. Popular in Essex County, where it originated.
Dyer or Pomme Royal, *Spice Apple.* *Beard Burden.*	y.	l.	A.	–	Superior quality ; not a great bearer ; requires high culture.
Early Harvest, *Yellow Harvest.*	y.	l.	S.	M.	American. Requires high culture and thinning.
Fameuse, *Pomme de Neige.* *Snow Apple.*	r.	s.	E.W.	M.	Hardy, even in Canada ; requires high culture.

Fall Pippin,	y.	l.	L. A.	M.	
Foundling,	st.	l.	A.	M.	American. Succeeds in any fair soil; fine for private garden.
Golden Sweeting, *Orange Sweeting.*	y.	m.	E. A.	K. M.	American.
Gravenstien,	st.	l.	A.	M.	Succeeds generally; productive; none more popular.
Green Sweet,	g.	l.	L. W.	K.	Very prolific; adheres firmly during gales; keeps till spring.
Holden Pippin,	y.	l.	A.	M.	American. Native and popular in Middlesex County.
Hubbardston Nonsuch,	r.	l.	E. W.	M.	American. Succeeds well on any good common soil; very popular.
Hunt's Russet,	rus.	m.	L. W.	M.	Great bearer on alternate years; tender flesh; requires warm soil; keeps late.
Jewett's Fine Red, *Nodhead.*	r.	m.	L. A.	–	American. Great bearer; requiring high culture and thinning.
Large Yellow Bough, *Sweet Bough.*	y.	l.	S.	K. M.	American. Regular bearer; superior early sort.
Ladies' Sweeting,	r.	m.	L. W.	K. M.	American. Requires warm, loamy soil and thinning; great bearer; keeps till May.
Lyman's Pumpkin Sweet, *Pound Sweet.*	y.	l.	L. A.	K. M.	American. Commences ripening in September; keeps to January.
Lyscom,	st.	l.	A.	M.	Popular in Worcester County.
Maiden's Blush,	y.	m.	A.	K. M.	One of the best early cooking sorts.
Minister,	st.	l.	E. W.	–	American. Very productive; hardy; tender flesh; requires careful handling; popular in Essex County.
Mother,	r.	m.	E. W.	–	American.

APPLES—*Concluded.*

	Color.	Size.	Season.	Use.	REMARKS.
Northern Spy, . . .	st.	l.	L. W.	M.	American. Thrifty; prolific; keeps late; very hardy; latest to put forth its leaf; fruit requires careful handling.
Old Pumpkin Sweet, .	rus.	l.	E. A.	K. M.	Hardy and productive.
Peck's Pleasant, . .	y.	l.	W.	–	American. Moderate bearer every year; requires good culture.
Pickman Pippin, . .	y.	m.	L. W.	K.	Hardy; popular in Essex County.
Porter, ...	y.	l.	A.	M.	American. Bruises easily; requires warm, silicious loam.
Red Canada, . . . *Old Nonsuch.*	r.	m.	W.	–	American. Requires a warm, generous soil; bears on alternate years.
Ramsdell's Sweet, . .	r.	m.	E. W.	K.	American. Very hardy; handsome, erect tree.
Rhode Island Greening, .	g.	l.	W.	M.	American. Requires a strong, rich soil.
Roxbury Russet, . . *Boston Russet.*	rus.	m.	L. W.	M.	American. Indispensable as a late fruit; requires a strong, rich soil.
Seaver Sweet, . .	y.	l.	W.	K.	American. Great bearer; hardy; with careful handling will keep through winter.
Talman's Sweeting, . .	y.	m.	W.	K. M.	American. Prolific; hardy; very popular.
Twenty Ounce Apple, . *Cayuga Streak.*	st.	l.	E. W.	M.	American. Should not be planted in an exposed situation; fine tree; bears early.
William's Favorite, . .	r.	l.	S.	K. M.	American. Ripens in succession; great favorite in Boston; feeble tree in nursery; requires high culture.

PEARS.

The columns indicate: 1st, The Color; 2d, Size; 3d, Season; 4th, Use; 5th, Stock. The abbreviations are: Prevailing Color.—p, pale; d, dark; b brown; g. green; y, yellow; r, red; rus, russet. Size.—l, large; m, medium, s, small. Season.—S, Summer; A, Autumn; W, Winter; E, Early; L, Late Use.—K, designates those for kitchen purposes only. M, those most profitable for market. Those not marked K or M are all table or dessert pears. Stock.—Q, Those which are known to succeed on the Quince stock.

	Color.	Size.	Season.	Use.	Stock.	REMARKS.
Abbott, ...	y. r.	m.	A.	–	–	American. Thrifty tree; great bearer; handsome fruit.
Andrews, ...	g. b.	m.	E. A.	–	–	American. Hardy; popular; irregular in growth.
Bartlett, ...	y.	l.	E. A.	M.	–	Very popular; does best on rich, warm, loamy soil.
Belle Lucrative, . . . *Fondante d'Automne.*	g. y.	m.	E. A.	–	Q.	Very hardy, productive and rich; succeeds with common culture.
Beurré Boss, . . .	rus.	l.	A.	–	–	Requires a rich, half silicious, warm soil; succeeds only as a standard.
Beurré Clairgeau, . .	y. b.	l.	L. A.	M.	–	Very handsome; requires generous soil and favorable location to bring the fruit to great perfection.
Beurré d'Anjou, . .	g. y.	l.	L. A.	M.	Q.	Hardy and productive; size uniform; adapts itself to common soils; a good orchard variety.
Beurré Diel, . . .	y.	l.	L. A.	M.	Q.	Requires a rich, warm soil and favorable location.
Beurré Giffard, . .	y. b.	m.	S.	–	–	Best as a standard , requires high culture.
Beurré Golden of Bilboa, .	y.	m.	E. A.	M.	–	Prolific and hardy.
Beurré Hardy, ... *Beurre Sterckman.*	rus. b.	l.	A.	–	Q.	Standard trees attain to a large size.

PEARS—*Concluded.*

	Color.	Size.	Season.	Use.	Stock.	REMARKS.
Beurré Langelier, . .	g. y.	l.	W.	–	Q.	Handsome; tardy; standard trees are long coming into bearing.
Beurré Superfin, . .	g. rus.	l.	A.	–	Q.	Equal in quality to the Old Brown Beurré.
Black Worcester, . . *Iron Pear.*	rus.	l.	L. W.	K. M.	–	Hardy; productive; keeps late; good for exportation.
Bloodgood, . . .	g. y.	m.	S.	–	–	American. Does not come early into fruit.
Brandywine, . . .	rus.	m.	E. A.	–	Q.	American. Hardy; productive; erect, beautiful tree.
Buffum, ...	y. r.	m.	A.	M.	Q.	American. Rapid growth; abundant bearer; succeeds on any common good soil.
Catillac, ...	y. r.	l.	L. W.	K. M.	–	Keeps late; grows well in cold exposure; baking pear.
Cushing, ...	p. y.	m.	A.	–	–	American. Hardy and prolific; succeeds well in common soils.
Dearborn's Seedling, .	p. y.	s.	S.	–	Q.	American. Requires a warm, rich soil.
Doyenne Boussock, . .	g. y.	l.	E. A.	M.	–	Vigorous, hardy, prolific; tree acquires a large size.
Doyenne d'Alencon, . . *Doyenne d'hiver nouveau.*	g. y.	m.	L. W.	–	Q.	Wants very rich, warm soil; keeps till May.
Doyenne d'Ete, . . *Doyenne de Juillet.* *Summer Doyenne.*	y. r.	s.	E. S.	–	–	The earliest summer pear.
Duchesse d'Angouleme, .	y. r.	l.	L. A.	M.	Q.	Requires warm aspect; better on quince than pear stock.

Flemish Beauty,	rus. b.	l.	A.	M.	–	Hardy throughout most of the country; succeeds best on a silicious loam.
Lawrence,	p. y.	m.	E. W.	M.	–	American. Sugary and rich; requires good soil.
Louise bonne de Jersey,	g. b.	l.	E. A.	M.	Q.	Very popular; great bearer; better on quince stock than as a standard.
Merriam,	rus. y.	m.	A.	–	–	American. Hardy and prolific; will succeed on common soils.
Nouveau Poiteau,	rus. g.	l.	L. A.	–	Q.	Vigorous, hardy tree; very prolific; will succeed in cold exposures and in common soil.
Onondaga, *Swan's Orange.*	y.	l.	A.	M.	–	American. Excellent hardy orchard variety.
Paradise d'Automne,	rus.	m.	A.	–	–	Very prolific; good orchard variety.
Pratt,	y.	m.	A.	–	–	American. Very popular in Rhode Island; an excellent, hardy kind.
Rostiezer,	rus. b.	s.	S.	–	–	Straggling grower; resembles Seckel in flavor; rich, but not quite equal to it.
St. Michel Archange,	g. y.	l.	A.	–	–	Hardy and robust; holding its foliage till late in the autumn.
Sheldon,	rus.	m.	A.	M.	–	American. Rich; productive. requires a favorable location.
Seckel,	rus. b.	s.	A.	M.	–	American. Requires very rich soil and high culture.
Sterling,	y. r.	m.	L. S.	M.	–	American. Vigorous tree; succeeds well on tolerably good soils.
Supreme de Quimper,	y.	m.	S.	–	–	Hardy tree and handsome fruit.
Tyson,	y. r.	m.	S.	–	–	American. Straight, erect tree; very late in coming into bearing.
Urbaniste, *Buerré Picquery.*	y.	m.	A.	M.	Q.	Tardy in coming into bearing on standards; better on quince; prolific and excellent.
Uvedale's St. Germain, *Pound. Angora.*	g.	l.	L. W.	K.	–	Very large cooking pear; keeps late.
Vicar of Winkfield, *Monsieur le Cure.*	y.	l.	E. W.	M.	Q.	Very hardy and productive; succeeds on fair soil; never fails of a crop.
Winter Nelis, *Bonne de Malines.*	rus.	s.	E. W.	–	Q.	Feeble grower; requires a rich, deep, moderately moist soil; a pear of fine quality.

The general principles which govern successful fruit-culture are now so well understood by intelligent cultivators, that they need only to be repeated and enforced. Your committee would, however, submit the following suggestions as worthy of consideration and for a more elaborate treatise would refer the reader to the report made to this Board for the year 1859.

1st. *The salutary influences of thorough draining, the proper preparation of the soil, and the necessity of judicious and careful cultivation to ensure the healthful development and longevity of fruit trees.*

In the preparation of the site for an orchard, thorough draining of the soil is uniformly advantageous. This is now admitted by all good cultivators to be an indispensable condition to perfect success in the production of fine trees and handsome fruit. Wherever there is an excess of water in the soil, at any season of the year, the health of the trees, sooner or later, will be impaired and its life shortened. Most of the diseases which have affected fruit trees, in our region, such as the spotting of the foliage, decomposition of the bark, and the blasting and cracking of the fruit, are attributable to uncongenial and imperfectly drained soils. In fact there are very few locations where draining is not beneficial. In undrained soils water accumulates first at the extremities of the lower roots. When, therefore, autumn approaches, evaporation growing less and less, and the temperature of the earth being reduced, the roots become chilled and the functions of the tree arrested, just at the time when in our climate they are most required for bringing our fruits to perfect maturity. All lands intended for orchards should not only be well drained, but the land should be thoroughly ploughed, deeply if not subsoiled. The advantages resulting from such properly prepared soils is now so universally acknowledged as to need no further discussion in this report.

An orchard should always be kept free from grass, grain and weeds. No other product should be grown upon the soil, except vegetables, and these only while the trees are young and occupy but a small portion of the land. And when the trees attain a bearing condition, the cultivation of the soil should not extend to the depth of more than three inches, never disturbing the roots with the plough or spade. The practice of seeding down orchards to grass or grain, except on the over rich soils like those of the West, should be carefully avoided. Neither can the digging of small circles around the trunks of trees in grass land be recommended as of any great benefit, as the roots of mature trees, extend far beyond the outlines of these circles.

The influence of soils on certain kinds of fruits is remarkable. Some succeed on any tolerably good lands; some best on light, loamy, half silicious soils, others require a strong, rich, and yet feathery bottom to bring them to perfection. The limits of this report will not permit of the specification of the particular soil and location for each variety, and only to allude very briefly to these particulars in the catalogue herewith presented. It is hoped, however, that in coming time, this information may be obtained and diffused through the agency of this Board in regard to all the fruits that may be adapted to the soils of our Commonwealth.

2d. *The necessary adaptation of varieties to the constituents of the soil, and to the proper location, aspect or exposure, for the production of fine fruit.*

Particular attention should be given not only to the location but to the aspect and exposure of fruit trees. A common error is to disregard the time of ripening. The warmest sites and most genial locations are frequently selected for the early varieties. These should be assigned to our latest sorts which require sheltered or southern exposure and a warm and fertile soil. The most favorable location is not so indispensably necessary for the early, as for the late fruits, the former ripening under the more direct rays of the sun and in a much higher temperature. We should also have regard to the different ability of fruit trees to resist cold and other meteorological agents. Some kinds are suited to one location, some to another, and a very few flourish in a great variety of latitudes.

As to the means of protecting fruit trees from injuries by the fluctuation of the temperature we need more knowledge. So powerful is the influence of temperature and aspect, that the Belgians in their descriptive catalogues, describe the site east, west or south, most favorable to each sort. In regard to shelter by forests, belts of trees or fences so as to protect our trees from currents of fierce drying winds, which are equally as disastrous to vegetation as parching heat, no one can doubt its beneficial influence on many varieties which succeed indifferently under other circumstances. With respect to these facts and their peculiarities of certain varieties, your committee have had reference in this report as far as possible, and it is hoped that the time may not be distant when the soil, locality, and aspect for each variety may be designated in our catalogues.

3d. *The importance of raising new and improved varieties from seed, as the surest means of procuring those best adapted to our immediate latitude and location.*

The great loss which has been sustained by the planting of foreign varieties of fruits not well adapted to our location and climate, suggests the absolute importance of raising from seed new and valuable sorts grown on our own soil and adapted to our climate. The results already obtained by the production of valuable American varieties suited to the various districts of our country cannot be too highly estimated. Most of these have been the offspring of accidental seed. Some fine kinds have been originated by planting the seed of good varieties, and the success which has attended these efforts affords great encouragement to perseverance in this line. When we reflect upon the little effort which has been made to produce new varieties from seed it is wonderful what progress has been made. More than one hundred varieties of American apples and more than sixty varieties of American pears are known to exist in the collections of cultivators.

In the selection of seed especial care should be taken in planting only the most mature and perfect seed, of the most hardy, vigorous and valuable sorts, on the general and well known principle that immature or imperfect seed will not produce a robust and healthy offspring. The hybridization or cross-fertilization of varieties in the hands of a skilful and scientific operator, by which he combines the characteristics of certain varieties, is more reliable and progressive, and opens up to the intelligent cultivator a wide field for improvement. In his hands are placed the means of continual and rapid progress, without the numerous uncertainties which must ever attend the sowing of seed accidentally fertilized. Let not this recommendation in regard to cross-fertilization discourage the planting of other seeds because they have not been artificially impregnated, for they are frequently fertilized by the wind or insects bearing the pollen from one variety to another.

In the production of new sorts we should aim first at a strong, hardy, vigorous habit, and thus overcome a difficulty which now exists with many of our best fruits. This is only to be secured by the choice of parent varieties to breed from which possess these characteristics. In regard to bearing properties we should select those which come early into fruit and set the fruit readily and annually, like the Bartlett, Louise bonne de Jersey, and Vicar of Winkfield pears, and not like many others which do not set their fruit until they have attained a great age. With the apple we should study to produce kinds with the constitution and beauty of habit as well as of fruit, like the Baldwin, Gravenstien, and King, of Tompkins County, and should avoid those of an opposite character.

Impressed with the belief that the future success of fruit culture in our country, must depend mainly upon varieties raised from seed adapted to our several soils and localities, your committee, without entering further and more minutely into the different processes for obtaining seedling fruits, would recommend to all cultivators to sow the seeds of their hardiest and best sorts, and as a means of arriving at an early result, to graft or bud the most promising seedlings on the branches of mature trees, so as to ascertain their characteristics, without waiting from generation to generation as in past time before they are known.

4th. *The judicious pruning of fruit trees and the necessity of thinning the crop.*

Different species and different varieties of the same species require different systems of pruning in order to control their propensities and develop their appropriate form. The pruning knife should, however, be used sparingly and only to answer the stern demands of necessity. To injudicious pruning or to the utter neglect of it at the proper time, may be traced much of the decline and decay of our orchards in New England. As to the season most appropriate for pruning, our judgment is in favor of early spring, while the sap is dormant, before the sugar and starch become liquified, or of midsummer, immediately after the first growth. In the latter case the sap has again become thick by elaboration and the tree will not bleed. Care should, however, be taken not to enfeeble the tree by the removal of large branches at this time of year. At whatever time pruning is done, all limbs of inch or more in diameter should be covered with grafting wax, liquid shellac, clay, or some substance to protect the wound from the weather. The true policy is to commence with trees while they are young, watch them carefully, and prune them judiciously until they come into bearing, after which they will require but little pruning, except the removal of water shoots and suckers. Pruning should always be refrained from unless a good reason can be given for the removal of each individual limb.

Intimately connected with the science of *pruning*, is the necessity of *a proper thinning of the crop*. This branch of pomology has received comparatively but little attention. There is a limit to the capabilities of all created things. If you tax the energies of an animal too severely for a long time, the result will be premature age and decay. If you permit a tree to bear beyond its strength, you injure its fruit, retard its growth, and shorten its life. All have observed that superfecundity one year produces barrenness the next. Hence we hear among our farmers and gardeners of what they term the bearing year. They invariably designate the Baldwin apple as a tree that bears on alternate years. The cause of this alternation is found in the fact, that the abundant crop of the bearing year exhausts the energies of the tree, and absorbs the pabulum so as not to leave sufficient aliment for the formation of fruit spurs for the succeeding year? Many varieties have a tendency to overbearing, especially those which produce their fruit in clusters. Nature herself teaches us the remedy for this evil, and a superabundance of blossom is generally followed by a profuse falling of the embryo fruit. When and where this dropping is not sufficient to prevent overbearing, we should resort to the process of relieving the tree of a portion of its fruit.

The organism which carries on healthful development, in order to repeat its cycle of functions from year to year, cannot be overworked without time for recuperation. Whatever of nutrition goes to the support of useless branches, or a redundancy of fruit, abstracts that strength from the tree which would otherwise be appropriated to the perfection of the crop, and the development of the spurs which would bear fruit the next year. One of the best cultivators in the vicinity of Boston has reduced this theory to practice, with the happiest effect, in the cultivation of the pear. His system allows no useless wood, nor more fruit spurs, and no more fruit than the tree can properly sustain. As a consequence, he produces every year superior fruit, which commands the highest price. Some have doubted whether this practice can be made remunerative, except in its application to the finer fruits. But another cultivator, in the vicinity of Boston, who raises an annual crop of the best apples, assures us that the secret of his success is the thinning of the fruit, and he has no doubt of the economy of the practice. No good farmer doubts the necessity of thinning his root crops, no *vigneron* the propriety of thinning his grapes.

Light, air, and moisture, are essential to the production of vegetable products, and especially of fine fruits. Who has not observed that the best specimens of fruits on a tree are ordinarily those which are most exposed to these elements? Who does not select the full-sized ruddy fruit, which has had free communion with light, heat, and air, in preference to the half fed specimen which has shared its own proper nourishment with five or six crowded rivals on the same spur?

An experienced English cultivator says: "The bending of branches of trees by an overcrop of fruit is most injurious, for the pores of the woody stalk are strained on the one side of the bend, and compressed on the other; hence the vessels through which the requisite nourishment flows being partially shut up, the growth of the fruit is retarded in proportion to the straining and compression of the stalk." This is illustrated in the overbearing of some varieties, which, from a redundancy of fruit, without the process of early and thorough thinning, seldom produce good specimens, and in a few years become stinted and unhealthy trees. The overbearing of a tree is as much a tax upon its energies and constitution, as is the exhaustion of a field by excessive crops of the same kind, year after year, without a return of nutritive materials. Inexhaustible fertility is a chimera of the imagination. However fertile at first, the constant overcropping of a tree is a reduction of the elements on which health and fruitfulness depend. The great principle of sustenance and reciprocal relation runs through the whole mass of life, of mind, and of matter:

> "One cry with never ceasing sound,
> Circles Creation's ample round."

Another consideration connected with the process of thinning, is the time when the work should be executed. It should not be done before we can distinguish the choicest specimens in a cluster of fruit, nor delayed so long as to waste the energies of the tree. This practice, judiciously followed, will supersede the necessity of staying up the branches, will prevent injury to the tree by their breaking, and will prove decidedly economical.

Associated with the thinning of fruits is the expediency of gathering a part of the crop as soon as it approaches maturity. The remaining specimens will thereby be much increased in size and excellence. The fruit of a tree does not all come to maturity at the same time, hence this successional gathering will turn the crop to the highest practical account, and will keep the productive energies of the tree in a healthful and profitable condition.

In a word, fruits trees will not take care of themselves. Constant vigilance is the price of superior trees or superior fruit. The poet may sing of the

> "redundant growth
> Of vines and maize, and bower and brake,
> Which nature, kind to sloth,
> And scarce solicited by human toil,
> Pours from the riches of the teeming soil;"

but the cultivator of fruits must realize the fact, that without care and skill he cannot depend on uniform and continued success.

Marshall P. Wilder.
Jabez Fisher.
Ephraim W. Bull.
Nathan Durfee.
John B. Moore.
Asa Clement.

CULTIVATION OF THE GRAPE IN MASSACHUSETTS.

Mr. Bull, from the Committee on Grape Culture, submitted the following Report:—

The soil and climate of Massachusetts have not been supposed to be suited to the cultivation of the grape, and while we confined our cultivation to the foreign grape, the experience of grape-growers seemed to confirm this belief. The severity of our winters; the short summers, followed by early autumnal frosts, checking the growth and preventing the ripening of the immature wood; the great vicissitudes of temperature breeding mildew and disease, and the necessity of laying down and covering the vines to protect them from the severe frosts of winter; made the cultivation too troublesome and costly for most people to encounter.

Now and then a favorable autumn would ripen the wood and perfect the buds, so that a crop would be gathered in the succeeding year, but this was the exception to the rule, and occurred just often enough to encourage the grower to continue his efforts, but not to make them profitable, or even, on the whole, successful.

Many growers, wearied with their ill success, gave up the culture of the grape entirely. Some few still grew it against the house, but even this protection failed, in the severe winters of 1857, '58, and '59, in many instances, to save even the Isabella from destruction, vines twenty years old having been killed to the ground at that time.

Notwithstanding these discouragements, however, the cultivation of the grape has increased in Massachusetts, and since the seedlings of our native grape have been substituted for the foreign, cultivators have met with a gratifying success.

Of this stock we now have grapes which are hardy and prolific, handsome and good, proof against that neglect which is so natural a feature in the farming of a country comparatively new, in which care implies cost more than in older and more populous countries; grapes which can be sold in the market at a price which will remunerate the grower better, perhaps, than any other crop he can raise.

No word in the language has so uncertain a meaning as the term hardy, as applied to grapes. Many persons consider all plants hardy which can be made to live in the open air, though protected in winter by earth or other covering. Nurserymen, who naturally desire to possess and disseminate all the new grapes, annually offer for sale new varieties as hardy, without the possibility of proving it by actual experiment, (having probably received them as such,) which, upon trial, prove to be tender unless protected. We do not blame them; they labor in their vocation, and are looked to for all new things as soon as they are announced. We can only take the precaution to avoid planting, extensively, any grape which has not proved to be hardy under all ordinary circumstances.

Your committee assume that no grape is hardy, in the proper sense of that term, unless it will survive the winter without protection; and that no grape is worth the growing unless it is hardy in this particular. The high price of labor, and the necessities of harvesting, and of preparation for the winter, incident to our short seasons, would make it inexpedient for the majority of our farmers to cultivate any grape which requires protection.

It follows, therefore, that grape culture, to be successful, and in any sense universal, requires a grape possessing absolute immunity from all the usual vicissitudes of our climate; it should also be early, prolific, large, handsome and good. It should be a strong grower, for weak growing vines require a rich soil and abundant feeding, which adds much to the expense of cultivation, while a strong growing vine will give good crops on any good corn land, without much expense in feeding. It should be prolific, that the cultivator may get an abundant return for his labor; it should be large and handsome, that it may sell well in the market; it should ripen early, in order to escape our early autumnal frosts; and it should be, with these preliminaries, of as good quality as possible.

In regard to quality, it is yet too soon to expect from our native stock, grapes equal to those of European origin, perfected, as they are, by centuries of skilful cultivation; but such success has already been achieved as to encourage us in the belief that we shall, at no distant day, obtain grapes equal in quality to the foreign grape, which will be perfectly at home in our less favorable climate and soil. Let us confine our efforts to the raising of seedlings from our native stock, if we hope for a complete success; its structure and constitution are very different from those of the foreign grape; the thick and robust foliage resists the mildew, which robs the foreign grape of its foliage and the cultivator of his crop, and its great fecundity assures the vigneron an abundant harvest.

It is the belief of some of our most intelligent grape-growers that the American grape will yet produce vines yielding fruit superior to that from the European. Its more pronounced flavor and aroma, too harsh in the wild grape to be pleasant to the lover of grapes, will yet be toned down to a true perfume, and a rich and delicious flavor, superior to the simple sweetness and delicacy of the foreign grape. The wine made from it, also, while it may be different in flavor, is likely enough to be of more healthful and even agreeable quality. It will at least have this recommendation, that being perfectly pure it will be more wholesome and restorative than the hot and heady wines imported from abroad, medicated, as most of them are, for exportation to this market; and will save to the country millions of dollars now sent abroad for wines, few of which are wholesome, which might be saved by substituting our domestic wines for those imported.

Of climate, of which we have already spoken, it remains to be said that the nature of the soil and the aspect of the vineyard have much to do in modifying its severity and securing a ripe crop in unfavorable seasons, and this leads us to speak of

SOIL.

There is some diversity of opinion in regard to soil. Some contend that a strong, rich soil is the best for the grape. In a *hot climate* this is probably true, as such a soil would resist drought better than sandy or calcareous loams, which are generally recommended for the grape. Almost any soil, however, will do to grow the grape in—if for table use—if it can be made mellow; avoiding soils underlaid by a stiff, wet clay, and wet, spongy lands. The main requirement in regard to soil is *permeability;* the grape will flourish in any soil, not positively injurious, if its roots can easily penetrate it.

Some grapes seem to require a much richer soil than others; this is the case with the Diana, the Delaware, and indeed all such grapes as, from constitutional habit or want of vigor, make a slow growth in light soils, and it is probable that a seedling grape, born in a strong loam, would prefer its native soil to any other, and thrive best there ; while a seedling from a sandy loam would be impatient of a too rich and heavy soil, as happens with the Concord. It is quite possible, however, that some grapes would be improved by the change, a matter which we recommend to amateurs as worthy of experiment. Other things being equal, the *warmer* the soil the better the success, and this leads us to speak of

ASPECT.

All writers on the grape concur in giving the first place to a south aspect. A gentle slope sheltered from the north and east winds, on which the sun darts his genial rays during the whole day, warming the earth to a good depth, and bathing the plants in light from " morn till dewy eve," is undoubtedly the best. In such a situation, the vines receive a larger share of light and heat than in any other, and light and heat are the great essentials in the culture of the grape. The vine will succeed well, however, in any aspect from east to west, but always the best where the sun warms the earth to the greatest depth. A south-west aspect will be better than a south-east, and a west better than an east, because the rays of the sun lay upon it in the latter part of the day, and, in autumn, when the grapes are ripening, this afternoon sun is of great service. We do not always have choice of aspect, however, but we may grow the grape successfully in any aspect, from west to east, preferring first the south, next south-west, next south-east, next west, lastly east.

When a vineyard has an unfavorable aspect, as to prevailing winds, the planting of the vines in rows so as to present the broadside of the rows to the wind will be a considerable protection, but the rows should always run as near north and south as practicable, and should not, if it can be avoided, run east and west, for the obvious reason that the vines would shade the ground too much, and so retard the ripening of the grapes.

MANURES.

Nothing in relation to the cultivation of the grape has elicited so much controversy as the subject of manures. Some recommend the use of dead carcasses; one cultivator in the State of New York put a quarter of an ox under each of his Isabella vines and claimed an eminent success as the consequence; others who tried it found the roots of the vines rotted wherever they came in contact with the carcass. The truth seems to be that highly nitrogenized manures do quicken the growth of those slender growing vines which require extra stimulation, while more vigorous growers take up such an excess into their circulation as to infect them with disease. However the case may be in regard to weak and tender vines, we believe that grapes derived from the *Vitis Labrusca* of our fields are naturally impatient of excessive feeding; the wood is thereby forced into long, pointed, gross shoots, which, experience has shown, have imperfect fruit-buds and spongy wood, neither fit for bearing wood or propagation. This vine is found to grow vigorously and to great size in some places where it is impossible they could ever have received manures. If health and long life of the vine be desirable, it is better not to apply barnyard manure to the bearing vines—young vines will require some compost at the time of planting to promote the formation of roots, of course—but to give occasional dressings of such mineral substances as experience has shown to be necessary when they are not already contained in the soil of the vineyard. Grape-growers are all agreed, however, that sulphur, phosphate of lime and potash are indispensable to the grape; these substances are the most economically applied in the form of gypsum, which is sulphur in combination with lime; ashes, which supply potash, lime, some phosphates, sulphates, and silica, all of which are useful to the grape; and bone-dust, which supplies the phosphate of lime and nitrogenized matter. In the cultivation of the Concord in the vineyard, the chairman of your committee has found twenty bushels of bone-dust, twenty of live wood ashes, and five of gypsum, a sufficient dressing for an acre of vines once in three years; soil a light sandy loam. On the whole, we believe the safest method will be to avoid excessive manuring with barnyard manures, and, if *necessary* to do so, to give light top-dressings only until the grape gives a satisfactory growth. But it will usually be found that the vineyard, after the first year, will not require any other than the mineral manures above named to insure plenty of bearing wood and good crops.

If the soil has not been enriched for the preceding crop — which should be corn, to ensure clean tillage — it will be well to add thirty or forty loads of good manure, per acre, well composted, *at the time of planting the young vines.* Cow manure is best suited to light soils, and promotes the formation of roots better than that of the horse; sheep manure is adapted to the grape, but being stronger, must not be used in so large quantities as is recommended for cow manure. All cultivators will of course understand that horse manure is better than that of cow's to lighten and warm a stiff soil, but, as such soil is not the best for the grape, we have recommended the manure of cows and sheep, the first being the best; but after the first year we recommend the use of mineral manures alone.

PREPARATION OF THE SOIL.

The directions for preparing the ground for planting the grape usually prescribe trenching as absolutely necessary to success in grape culture. In France the custom is to trench about two feet deep; in Spain, about thirty-three inches (one "vara," or Spanish yard); in Italy they trench even to the depth of five feet, where it is possible, and it is to be presumed that a custom which has been followed for so many generations that it has become the rule of the case, is necessary in the hot climate and long seasons of those countries; but in our colder climate and shorter seasons we believe trenching to be pernicious for the following reasons:

Deep trenching invites the roots into the colder and less fertile subsoil, thereby inducing a late growth of wood, which is never, except in a very favorable season, so solid and short-jointed as it should be to secure the best and earliest fruit; the vine also forms roots near the surface, which are injured and torn by the necessary cultivation, leaving the lower roots to derive from the cold and infertile subsoil the support of the vine, which, in consequence, starts later into growth, and matures its fruit and wood at a later season, if indeed, it is able to mature them at all.

Heat at the root, "bottom heat" is essential to success in grape culture, and as the soil in this climate is seldom warmed, during our brief summers, to a greater depth than one foot, we believe that that depth should not be exceeded in the preparation of the soil for planting, unless, indeed, it be necessary to break up the subsoil to promote drainage in a soil which is wet at some seasons of the year, for the grape is impatient of a wet soil, which is always colder than a dry one, but on a sandy loam with a porous subsoil, which is the best for the grape, the stirring of the earth to a great depth will do more harm than good.

PLANTING.

For planting, we recommend strong, well-rooted vines of two years; these come to bearing sooner than the yearling vines, being better established and with better wood and roots, while they are more easy to handle than older vines, the long roots of which will give too much trouble in planting on a large scale.

Buy the vines from a grower, who will take them up carefully, and give you all the roots; you can better spare the superfluous tops of the vine than any of the roots, which are never superfluous.

In planting, take care to spread out the roots in every direction, but do not let them cross or overlay each other, which leads to the formation of knots, which interrupt the flow of the sap. The proper depth to plant is, in our climate, six inches; if less than this the roots may suffer from drought; if more, new roots are likely to be formed in the warmer surface soil which will be broken and torn by the cultivation, while the lower roots will go down into the colder and less fertile subsoil, and the vine will not ripen its wood so well, nor the fruit so early.

As to the best time for planting the vine, the autumn is the best season, if the soil be dry, as the roots get well established in the soil, usually making fibres from the main roots during the first two or three weeks after planting, and they are thus prepared to start early in the spring, getting a good growth before they are pinched by the heat and drought of midsummer; this is a great gain in such soils; but if they be wet or heavy, and liable to heave with the winter frosts, or if water stand upon it in the winter and spring, then we would prefer the latter season, when the advancing warmth promotes the formation of the fibrous roots, and the vine, having the whole summer to establish itself, is much more likely to go through the ensuing winter without harm. It is always good husbandry to put an inch or two of leaf mould or chip dirt about the plants the first winter after planting, to prevent heaving by frost; after the first winter they are safe.

AT WHAT DISTANCE APART SHOULD THE VINES BE PLANTED?

The vines raised from the *Vitis Labrusca* require much more room than is usually allowed in vineyard culture. The directions copied from foreign books on the grape, although well adapted to the foreign grape, will certainly mislead the cultivator who applies them to our native varieties, some of which make shoots twelve or fifteen feet long in a single year.

Buchanan, in his treatise on grape culture says: "For steep hill-sides three and a half feet by four and a half, or three feet by five, may answer, but for gentle slopes, three and a half by six is close enough, and for level land four feet by seven." We think eight feet by eight close enough for vineyard culture — which will permit the use of the plough and cart. If the vineyard is of limited extent, and an early return for the capital is desired, plant eight feet by four, and after a few seasons cut out every alternate vine, leaving them at last eight by eight.

The reason for giving the vines this wider space to grow in, will be obvious when one recollects how large a space a single vine will cover under favorable circumstances, and that there should be a proper balance between the roots and branches, both of which should be as near as possible to what nature designed; that is to say, should have a good extension, that the vine may be healthy and long-lived. An additional reason for these larger distances will be found in the facility which they afford for the passage of the team in carting off the crop, and in ploughing and cultivating the soil; the sun also finds access to the soil, more than in close planting, giving that warmth to the root so essential to the ripening of the crop.

PRUNING.

There are various modes of pruning the grape, all of which have value and adaptation to particular circumstances, as covering a certain space, an ornamental espalier, or the production of large bunches of fruit. And this last is an object of some importance, for, other things being equal, the largest and handsomest bunches are the most valuable, often bringing in the market double the price which can be obtained for small bunches.

We shall speak of the renewal, or long cane system, and spur pruning; either of which, judiciously followed, will give good crops and large bunches, always supposing the kind of grape cultivated will give large bunches, for many kinds of grapes, though of fine quality, cannot be made to give large bunches under any kind of pruning. We should mention, also, that some kinds of grape, as the Clinton, Strawberry, and such grapes generally as make long, slender wood, must be laid in long canes upon the espalier to give good crops.

To begin at the beginning, then, we will suppose the vine just planted and cut down to two eyes; after these two eyes have grown about a foot, pinch the weakest one at the end and train the strongest one to the pole or espalier. If it run away weakly, pinch it occasionally, which will set back the sap and thicken the stem; it will probably push out lateral shoots, which should always be pinched at the second leaf; this will prevent the formation of weak, watery shoots, and strengthen the leader. At the end of the season cut back the long shoot to the lower bar of the espalier, which is usually about eighteen inches from the ground, and cut the short one clean back to the old wood, your purpose being to have a single stem for about a half yard from the ground; but if the grape is trained against a house, and it is desired to lead off the side arms at a greater heighth, as above a door, &c., then cut off the vine at that heighth, observing that there must be but one stem from the ground to the point from whence the arms diverge; and any shoots which come out at the base of the vine must always be rubbed out, lest they run away with the strength of the vine and rob the upper shoots of the necessary sap.

The second year you will allow two shoots to grow from the top of the vine; lay them in diagonally on the espalier, pinching them occasionally as before, and if the buds on the main stem push, pinch them at the second leaf as before. At the fall pruning, all the laterals should be cut clean out. At the end of the season cut away all the laterals, and lay in the two shoots right and left on the espalier, horizontally, cutting each of them back to a strong bud. Be sure to cut back to a strong bud, for these arms are to be permanent, and it is necessary the wood should be strong and well ripened.

The third year you may take a few bunches, if your vine is strong, but it is better to wait until the fourth year, as the bearing even a few bunches checks the extension of wood. Your side arms will push every eye. Train upright shoots from these horizontal arms at about eighteen inches distance; this will usually be every alternate bud; rub out the bud in the interval, *all buds*, if there be more than one between these upright shoots; pinch all laterals at the second leaf as before, whether on old wood or new, and pinch the upright shoots when they get to the top of the espalier; sooner, if they run away weakly.

In the autumn, *cut every alternate upright shoot back to one eye*, to make new shoots next year for subsequent bearing, and leave the others at full length for bearing, unless they are not strong; in that case cut them back to a strong bud. It may happen that the side shoots will take several years to fill up the espalier with strong wood; but do not fail to cut them back at every fall pruning to a strong bud, making sure of getting strong wood, though you get it little by little; cut away all laterals as before.

You have now got a number of upright shoots for bearing; every eye will push and probably set fruit, and now, unless you have the firmness to cut out two-thirds of the fruit, you are in danger of over-cropping the vine with its first crop. Not more than twenty bunches of fruit should be allowed to remain, and these should be of the largest and best placed. The thinning should be done when the young grapes are as large as young peas; pinch these laterals, now bearing fruit, at four leaves beyond the bunch you leave on; this will generally be the first or second bunch, the *largest* of course. If the laterals push again, pinch at the second leaf as before. You will train up the alternate shoots, pinching them at the top of the espalier, and also all laterals as before. These are to be the bearing wood of next year. After the fall of the leaf, prune out all the upright shoots which have borne fruit to one bud, and all *laterals* from the *new shoots* which you have trained up for bearing next year.

This is the system known as the renewal system. It is well adapted to the house or the espalier. If applied to vineyard culture, you must have two poles to each vine, (after the third year) cutting out each cane in alternate years.

Spur pruning, however, is better adapted to field culture in our climate, if we may trust our own experience. The vine is not called upon to make so much wood, and after it is well established, any intelligent boy who can handle a knife, can prune the vine as well as a thorough bred gardener. Train up your vine as before, with a single stem; cut out all laterals at the end of the first year; and cut back the main stem to eighteen inches from the ground; lead up a single stem from the upper bud the next year, tying it to the pole and pinching when it has reached to the top of the pole, which should be six feet high. Pinch all laterals, as in the renewal system, and if the main stem is not strong, cut back to a strong bud.

The next year you will make your spurs; let them be alternate, right and left, and as nearly equi-distant as possible. Pinch them in occasionally, and if side-shoots push, pinch them at the *first leaf.* Do not let the spurs grow more than half a yard or two feet long, for you want strong buds at the base of the shoot to bear next year.

At the fall pruning, cut back the lowest spur to three eyes; cut out the second and third spur to *one* eye each; this brings you to the fourth spur, which is opposite the first; cut this back to three eyes; proceed as before through the whole length of the vine. You will have alternate spurs for fruiting, and the intervening spurs cut back to one eye, to make bearing wood for the next season, when the spurs which have borne this year are to be cut back to one eye, to make new spurs for alternate bearings. A modification of spur pruning, practiced by some grape growers, is to cut back the spur to the *strongest bud,* without regard to the length of the spur; rubbing out the shoots from the other eyes, except the one at the base of the spur, which is trained for the new wood of the next season, the old spur being cut clean out, at the fall pruning. Well established vines, spur-pruned, generally ripen their crops a few days earlier than vines pruned on the renewal system.

The best time of pruning for this latitude is probably the early part of November. If the vine is pruned at that time, the organizable matter which the roots continue to take up until hard frost prevails, charges the wood and the buds, making them to start with more vigor in the succeeding spring, and perhaps increasing, to some extent, the size of the bunch. It is safe, however, to prune at any time after the fall of the leaf until the succeeding spring, avoiding to prune when the wood is frozen, or so late in the spring that the vine will bleed, which would be likely to happen at the beginning of April.

PROPAGATION.

No vineyard can be said to be complete until provision is made for a supply of new plants to take the place of those lost by accident, or which prove weak or unproductive, (and if weak they will be unproductive,) and to furnish vines for planting new vineyards. We offer, therefore, the results of our experience in this connection, in order that the beginner may avoid loss of time and money through the purchase of vines weakened by excessive propagation.

It is the custom in wine countries to raise new plants only from the best ripened wood of a bearing vine, and that which ripens its fruit the earliest, and they maintain that, in this way, they procure vines that bear earlier fruit than the parent vine, as happens with seed-bearing plants, the precocity of which may be increased by saving the earliest and best seed from year to year.

When the nurseryman has received a new grape, he naturally desires to propagate it as fast as possible, he therefore raises his new plants from single eyes, and when these grow, propagates again from these young and necessarily enfeebled vines. The consequence is, the vines, weakened by this process, do not ripen their fruit so early, nor grow with such vigor as vines raised from *cuttings of strong wood from well-established vines.* The difference in the time of ripening will usually be about ten or fifteen days, and the vines raised from cuttings of a foot or more in length are much superior to these raised from single eyes, because the greatly increased amount of organizable matter in the *cutting* not only pushes the growing bud with greater vigor, but greatly increases the quantity of roots, while the cutting, usually grown in the open air, is really better adapted to vineyard culture for that reason, being more hardy than the vine grown in a propagating-house with artificial heat. The weak vines, raised in this way, and ripening their fruit at a later period — often a fortnight — than the season announced by the vendor, and sometimes failing to ripen their fruit at all; while the weak and immature wood often dies in the winter, lead many cultivators to believe the vine unworthy of cultivation, and sometimes to reject a variety which is really valuable and which would, when it had acquired strength, or if raised from strong plants, give entire satisfaction. For these reasons he should raise the vines himself when practicable, or otherwise get his plants, as before advised, of two years of age, strong, and well-rooted, of a nurseryman of established reputation.

If he grows them himself he will take the strongest and best shoots from bearing vines, and having prepared a piece of good ground, rather moist than dry, plant the cuttings as follows:— Open with the spade a trench deep enough to take in the cuttings in a slanting position, so that the last bud on the top of the cutting will be covered about one inch when the ground is levelled off. Place the cuttings, so that these eyes or buds will be as nearly as possible in a straight line for convenience in hoeing and weeding; let the cuttings be about one foot apart in the row, and the rows about three feet apart, (if pinched for room, two feet will do,) stir the ground frequently during the season, and if the weather prove very dry, water occasionally, and keep down all weeds. In the month of November following, cut down the vines to six or eight inches. In the second year, let all the wood grow, remembering that the more foliage the more roots, and roots are what you desire to make strong plants. Prune at the time of planting out to a single stem of about half a yard in length, and train the new growth to the pole or the espalier as you may prefer.

Good vines may be obtained from layers, which is a method some growers prefer to raising them from cuttings; but we consider this method objectionable—except in the case of vines which do not readily grow from cuttings—because it is very difficult to get up the roots of layers without disturbing the roots of the parent vine; and because it is necessary to put a liberal dressing of compost on the ground to promote the formation of roots; and this dressing pushes the old vine so rapidly that the wood is injured by it, and the crop impaired in quality. If, however, it be necessary to resort to this method, take the lowest shoots of the parent vine, strong and well ripened, cut a notch in the shoot on the under side, between the buds, and bury the shoot two or three inches under the surface of the soil. Keep the ground well stirred and free from weeds during the season, and take up the plants in the autumn of the same season, and plant them out in nursery rows to make the second year's growth. This is a sure and good method, but we prefer to grow from cuttings, as giving better two-year-old vines—not having been disturbed at the end of the first year, as is necessary with layers, because the roots would get so large that they could not be taken up without injury to the roots of the parent vine, and the young vines would be more difficult of cultivation than cuttings in rows.

Either of these methods will give the vine-grower good and reliable vines for his vineyard; but if by any accident a plant in his vineyard be destroyed, or so weakened that it will not thrive, take up the weak vine and replace it by the method of provingnage adopted in the French vineyards, which is only the laying of a strong shoot from an adjoining vine, about six inches under the surface, and training up the end of the shoot in the place of the vine destroyed. At the end of the first, or at most of the second year, sever the connection with the parent vine, and take care that no shoots be allowed to grow from the buds of the buried shoot; the object being to get one vine only in the place of that removed. This method will enable you to keep your vineyard full of vines at all times.

As to protection of vines in the winter, having already declared our belief, founded on our own experience of many years, that no vine which requires it will be found profitable, we do not recommend it; but if any are disposed to try it, they will find the best method to be the laying down of the vines in the autumn, and covering with two or three inches of earth. Another good method is to cover with pine boughs; but the covering of earth is the best. Tender varieties of the vine, however, are only suited to the garden of the amateur, and no vineyard can be long kept up with vines which are not hardy, and which are therefore cultivated at a much greater expense than is necessary with hardy grapes.

RAISING NEW VARIETIES FROM SEED.

This is probably the best method of obtaining improved varieties of hardy grapes; and when we consider that some of our very best apples and pears are seedlings of our own State, we may well take courage and enter upon the task of raising seedling grapes.

Many of the new grapes which have been ushered into public notice are chance seedlings of various parts of our country. Some of them, very good in their native locality, prove worthless, or if good, so ill adapted to our climate that they cannot be grown in it with profit and success. Some are of good quality, but too small for market; or poor bearers, or slender growers, or require such careful cultivation as makes them unprofitable. A grape for general cultivation must have such vigor of constitution as will bear neglect; and be comparatively indifferent to soil and location; not that these do not affect the quality of the fruit to some extent, for any grape will be better, other things being equal, which is grown on a good grape soil and location, than it will be if grown upon its opposite; but the grape for the market should be,—like the Bartlett pear and the Baldwin apple,—always salable, though it may be variable in its qualities in various soils and seasons.

It is obvious, therefore, that seedlings from our native *Vitis Labrusca* will be more likely to succeed with us, than seedlings from the foreign grape, or even from the grapes of other States. Even locality may breed a peculiarity in a seedling grape which will prevent its successful culture in any other locality, except such as are essentially like that in which it was born. One instance at least has fallen under our observation where this seemed to be the case. A chance seedling came up in a garden, under a high fence, upon its eastern side. This was not considered a good aspect, and for the purpose of improving the quality of the grape, it was removed to a south aspect, against a high building, where it was believed the grape would be entirely at home. Much to the surprise of the owner, the grape was not so good as before; after a fair trial it was removed to its former location, and again bore grapes of the same quality as those it bore before its first removal.

An old writer on the grape speaks of vines which "scarcely answer to their name after they have changed their place;"

and again, vines "the delicate flavor of whose wines is changed with the country;" vines also which "rejoice most in a fat and oosy ground, because it is able to give fruitfulness to vines that are naturally small and slender;" and some which will not endure a fat soil, but require a leaner ground; grapes which do best in cool climates, shrinking and perishing with great heat, and grapes which are nothing without great heat; vines—Genevan—which bear frost; vines which cast their fruit when ripe, and vines which climb the tallest trees, while some will scarcely reach the top of the espalier.

This was in Italy, eighteen hundred years ago, and the author considered the matter of so much importance that, after a full review of the difficulties attending it, so that "many doubted if they ought to have vineyards at all," he recommends the raising of vines from seed, enforcing his proposal by the statement that the "income of vineyards is the most abundant of any."

The horticulturist who shall succeed in obtaining a new grape of improved quality will not only receive a handsome profit for himself, but confer a lasting benefit on his fellow-citizens. This all good men desire, and this will be an additional inducement to such men to enter upon the raising of new grapes from seed. To those who are inclined to engage in this pursuit we offer the following suggestions.

The chairman of your committee has been engaged in raising new varieties of the grape from seed for more than twenty years. He adopted the mode of breeding from our native stock for reasons which will be obvious to those who read our remarks on hybridizing. We believe his method to be the best, and those who adopt it will have the satisfaction of knowing that they will not be obliged—as he was—to "begin at the beginning," but will have the advantage of starting from the new stand-point, so that, by raising new varieties from the seeds of those already obtained, they will have a reasonable assurance of success within a short period compared to that which he found necessary. From his report to the Board of Agriculture, published in the Seventh Annual Report of the Secretary, we quote:—

"Perhaps I cannot do a better service in this connection than to state my own experience in this branch of horticulture

Having pursued it for nearly twenty years, and finding my first opinions greatly modified in the course of that time, I may perhaps save the beginner some time in his practice, which he might otherwise lose for want of reliable data to commence upon.

"I was led to commence the raising of grapes from seed from the impossibility of ripening any of the grapes then in the lists of the nurserymen. Living in the Valley of the Concord, which has a season shortened at both ends by the early and late frosts incident to such localities; loving grapes more than any other fruit, but unable to ripen them, I turned my attention to our native stock, and procured from all quarters native vines which had a local reputation for excellence, but found myself disappointed in all of them.

"Believing that a good grape could be obtained out of this stock, and that if I attained success it would lead others to follow the same course, so that in time Massachusetts could have her own grapes, as she already had her Baldwins, her Porters, her Hubbardston and other excellent seedling apples, I set about the matter. I wanted a grape to begin with which should be a vigorous grower, hardy, prolific, early, and with these preliminaries, of as good quality as possible. I found such a grape—a good eating grape for a native—and with this I began. In five or six years the seedlings bore fruit,—these seeds were planted again,—and from these I obtained the 'Concord,' and from the latter, in the third generation from the beginning, I have got grapes of great variety, some of them excellent, if I may trust my own judgment. The original wild habit seems to be entirely broken up, and from the original stock, black as night, I have obtained grapes white as the Chasselas, delicate of texture, and of a most agreeable flavor.

"I had hitherto planted these seeds promiscuously in beds of rich soil, and when the seedlings bore fruit *all their* seeds were planted. This was not the best way. I raised many hundred more seedlings than I had need to, and should have succeeded more rapidly in my purpose if I had planted only the seeds of those grapes which showed the most marked change from the original type. I thought I multiplied my chances of success by putting into the ground the seeds of *all* the new vines. I had not yet learned that nature makes constant efforts to return to her normal condition, and resents the interference of man. Her purpose is merely the continuation of the species, and she gives vigor and adaptation to that end.

"The horticulturist desires the fruit, and not the seed. His efforts are directed to the amelioration of the harsh flavor; to softening the pulp; to making, in short, the fruit more edible. He accomplishes this by putting the seeds into a soil rich with stimulating composts, abounding with the particular food which is best adapted to his purpose. The new conditions change the character of the plant. Instead of meadow or pasture, where the parent vine grew with vigor, indeed, but with the coarse habit incident to wild nature, the new-born seedling revels in the abundant and congenial food prepared for it, and stimulated by the nature of its feeding, shows a change of habit more or less marked. This is the sign of improvement; of the *departure* from the native type, and the token of success to the cultivator. In the seed-bed will be found vines having short-jointed wood, perhaps smooth and solid, and with prominent buds. These vines deserve his special care; from them he will obtain vines with still more marked change of habit, and the greater the divergence from the original type, the more certain will be his success.

"Most of the seedlings, if you begin with the wild grape, will prove to be barren or worthless in the first generation. The barren grapes may be distinguished, for the most part, by their great luxuriance of growth, and in the first year the seed-bed will be filled with these rampant, and, to the novice, promising vines.

"My experience leads me to reject these strong vines of the first year, or at least to plant them in a quarter by themselves, as possibly I might get a good grape out of them, and if such should be the case, the strong growth would be desirable.

"I have spoken of these seedlings of the *first* year because the seeds continue to come up for two, three and even four years in succession, and my best grapes come from these later seedlings.

"There seems to be much probability in the theory propounded long ago, that one or more seeds of every fruit is strongly impressed with the peculiar type of the species to which it belongs, and will bring its like with precision, as happens with long-established breeds of cattle. How far the seeds of grapes are impressed with incipient change by stimulant composts or modes of culture applied to the parent vine, is an interesting subject of inquiry, but we cannot enter upon it here, though the subject is enticing, for want of space.

" I would strongly advise those who purpose to raise seedling grapes not to go back to the wild vine, but to commence with seeds of new varieties having the characteristics of vigor, earliness, etc., which they desire in the offspring. Plant the grapes whole, in rows to facilitate weeding ; the placenta like substance which surrounds the seed in the whole grape nourishes the seed and promotes its vegetative power ; it is important also that the tender seedling should suffer no check. Shade it from the hot sun, and water if necessary until it gets three or four of its rough leaves, after which it may be considered safe ; plant one inch deep, and keep down all weeds.

" When the seedlings have grown one year, lift them out of the bed without disturbing the level of the ground, and thereby burying the seeds which have not sprouted during the first season, for they will many of them grow in the second year. This can easily be done if the bed is thoroughly saturated with water, when with the aid of a fork you can draw out the plants with care without breaking a single root.

" The second year another crop will come up ; these will give a much larger proportion of bearing vines. These are lifted in the same way with the first, to make room for the third crop ; these last I save with the utmost care, as they will show the greatest improvement.

" When these seedlings are planted out they should be put into soil enriched with bone-dust, ashes and gypsum ; these fertilizers I consider indispensable to the grape. Stable manures induce a luxuriant growth of wood, but are apt to give a lax tissue to the wood, and should be used with caution, if at all. I prefer the mineral manures alone.

" Do not reject too hastily the vine at its first fruiting, for the size and quality of the fruit will improve for years ; the grape vine does not reach its best estate until seven or eight years after planting. I do not prune the seedling vine except to give it shape, but pinch in any branch which may be growing too rampant. These seedlings will not bear until the fifth or sixth year from the time of planting the seed."

Having thus given a succinct statement of the mode of breeding new grapes from our hardy native stock by direct descent, it remains to notice another method which it cannot be denied is received with much favor by many distinguished horticulturists, called

HYBRIDIZING, OR CROP FERTILIZATION.

This method consists in impregnating the germ of a hardy native grape with the pollen of the foreign grape, with a view to improve the quality of the hardy grape ; and it is claimed for it that the pollen of the foreign grape imparts its better quality to the fruit, while the hardy mother imparts its native vigor. This is true to a greater or less extent, when the hybridization is effected, but it is by no means certain that the tender habit of the foreign vine will not prevail so that the seedling will be at best but half hardy and require protection, in which case it would be without value for field culture. Nor is this the only objection ; seedlings from the hybrid would in all probability breed back, that is to say, the predominant native type would overpower the impregnation by the weaker foreign type, and the seedling would not be of so good quality as the hybrid from which it was raised. Certainly, if successful in the crossing, you arrive at your first success more quickly, but you have not got a reliable basis for future improvements ; and this, it seems to us, should be the prime object of the grape breeder ; for, as we have said before, the American grape will probably yield, in time, seedlings quite as good as the foreign grape, while they will immeasurably excel it in hardihood, early ripening, and adaptation to our soil and climate. These truths we think are plain, but we do not by any means wish to commit ourselves to the opinion that the hybrid could never be hardy, for we believe it to be possible that the native vigor of the mother vine *may* predominate so that the seedling would be hardy, but we think this would be the exception to the rule, and that the defect of constitutional force, and pre-disposition to mildew, common to the foreign grape in this climate—and even to some extent natural to it in its own country—would descend to the offspring, and so defeat the purpose of the grape-grower, or at least render the cultivation so troublesome and expensive that it would be unprofitable. We are aware that several promising hybrids have been raised by Mr. Rogers, of Salem, which are now on trial, and we hope may prove to be great acquisitions, but we think the rule of the case will be found to be as above stated.

We hope, however, that this frank statement of our belief will not deter any grape-grower from experimenting in cross-breeding. As before stated, he will achieve success—if he succeed at all—much sooner than by the slower process of successive reproduction and gradual amelioration of the pure native.

Hybridizing the grape is a process of great delicacy—almost of difficulty—but is quite possible, if great care is used. Some writers have directed the shoots of the two vines intended to be cross-bred to be intertwined on the espalier, in the belief that hybridization will thus be effected; this, however, though not quite impossible, is not likely to happen. The pollen of the grape is usually perfect before the calix is pushed off by the increasing growth of the stamens and is shed upon the germ, by the generally sudden movement of the stamens in throwing off the calix, under the stimulus of a warm sunshine. Some of the germs, however, as we have observed while cross-breeding ourselves, are not immediately impregnated, and in such case the watchful operator, by cutting away the stamens with a pair of sharp-pointed scissors, can impregnate the germ with the pollen of another variety, by the aid of a small camel's hair pencil, or even by shaking the pollen upon it from the bunch of bloom cut for that purpose. When the impregnated berry is ripe, it is usually taken to the hot-house and planted in a pot, from whence, when strong enough, it is planted out in the open ground. It should be covered in the winter until it gets strong, when it may be gradually exposed to the weather, to see if it is hardy. If it is not hardy, without protection, the fact ought always to be stated when it is offered for sale, for many an embryo grape-grower has lost all his enthusiasm and given up the pursuit, when he found the vine which had come to him as "perfectly hardy" dying off the first winter.

PROFITS OF GRAPE CULTURE.

We are aware, after all, that grape culture will not be entered upon very generally unless it is profitable; this we believe to be the case. All your committee are grape-growers, and we grow them somewhat extensively, and we have found them to be more profitable than other fruit. The cultivation is not costly or difficult, nor do they by any means require so much manure as other fruit crops, and the cultivator has the alternative of making his crop into wine, in case of a dull market, an alternative which he does not have with other fruits.

We subjoin the statement of Mr. Hunt, of Concord, in this connection, made to the Committee on Grapes at the Fair of the Middlesex Agricultural Society, held at Concord, on the 18th of September last. He says:—

"The Concord grapes exhibited by me to-day are from vines of five years' growth. My vineyard is located on the south side of what is known as Punkatasset Hill. The soil is warm, moderately strong but not rich, with a hard, retentive subsoil. A large portion of the soil now planted with grapes yielded little else than stone, whortleberry bushes and briars, with some small pitch pines. After removing these, I applied, at the rate of forty horse-cart loads per acre, a compost of barnyard manure and swamp muck, and planted potatoes. The next spring I applied the same quantity of manure, and planted the vines, in rows, running east and west, eight feet apart, seven feet apart in the rows. No fertilizing substance has been used since except wood ashes, at the rate of fifteen bushels the acre, up to the last year, and this year none."

After relating his method of pruning, which is on the spur system, he proceeds to say:—

"As to any information in regard to the profit, or the successful cultivation of the grape, I have had but little experience, therefore I will not attempt to instruct, but briefly relate some of my experience.

"I commenced with one dozen vines, but have now some five hundred, beside one thousand young vines in the nursery rows. Two hundred of the former are now loaded with fruit, estimated by good judges to yield at the rate of eight thousand pounds per acre. Last year the first crop was taken from these vines, about two hundred pounds, and sold for twelve and one-half cents per pound at wholesale, at retail for twenty-five.

"In conclusion, I would state that I have not attempted to produce grapes of extra size for exhibition, by ringing, extra fertilizing, or any other means not strictly applicable to the whole crop.

"Signed, THOMAS F. HUNT.

"Concord, Sept. 18, 1862."

This was before the crop was harvested. Subsequently the secretary of the society, J. B. Moore, visited the vineyard of Mr. Hunt, and staking off a lot of vines which he considered a fair average of the whole field, gathered and weighed the crop, and in his report on grapes, published in the "Middlesex Transactions" for 1862, speaks as follows: —

> "The distance apart that the vines should be planted is a question to be settled by more experience. Mr. Hunt plants, as you will see by his statement, eight feet by seven, which gives fifty-six square feet to a vine, or nearly seven hundred and seventy-eight vines to the acre. They are as yet but small vines, trained to a stake, like a common bean pole, but have already produced, on an average, fifteen and one-half pounds of grapes to a vine the present season, with only ordinary cultivation, being 12,059 pounds to the acre, which, at twelve and a half cents per pound, which is no more than the average price for the last few years, amounts to $1,507.37, and at ten cents per pound, a price for which large quantities could be sold, would amount to $1,205.90. This will well repay the grower."

He adds :—

> "To those who intend to cultivate the grape as an article of profit, we would say that we think it offers a more certain return in dollars and cents than any other fruit. The statements we have made, in regard to profits, are not fancy estimates, but may be relied on."

Your committee have endeavored to show in this report, necessarily imperfect, for it would require a separate report on each subject relating to grape culture to do it full justice, that the cultivation of the grape in Massachusetts will probably be attended with entire success. The enthusiasm which is now apparent in the public mind, in regard to it, is one of the first fruits of the success which has attended the efforts of the pioneers in this pursuit; a success which is both the reward of their labors and a pledge of still further successes.

To accomplish this final and assured success, that is to say, to obtain grapes of the best quality both for the table and for wine, grapes which we shall be able to grow without difficulty in all parts of our good old Commonwealth, it is only necessary that our horticulturists shall enter heartily upon the work of raising new grapes suited to our climate. It will be a labor which will bring them the double reward of pecuniary success, and the honest fame of public benefactors.

We offer a list of grapes for cultivation in Massachusetts, regretting that the list is so small, but in the full belief that it will, within a brief period, be considerably enlarged. Meanwhile we can only offer to the cultivator the advice of an old grape-grower, to grow only those grapes, on the large scale, which have been proved to be profitable, leaving to the amateur the trial of those which "promise well."

The CONCORD maintains its reputation as the best grape for the market yet raised. It is also a fine wine grape.

The HARTFORD PROLIFIC is a very good grape, prolific, early, hardy, has the defect of falling from the bunch when fully ripe. It has, however, held on to the bunch this season better than usual, and some cultivators attribute the fact to the greater strength which the vines have attained, but this is equally true this year of the NORTHERN MUSCADINE, an incorrigible dropper, and only a tolerable grape, which is, however, perfectly hardy and early.

The REBECCA is tender and liable to mildew and sunburn. It is of fine quality, though small, needs protection, and is only suitable for the garden of the amateur.

The DIANA, a well-known grape in this State, and throughout the country. In warmer latitudes it is much esteemed for its fine flavor, though it is prone to mildew, and the berries are frequently attacked by the rot. It is tender, and needs protection in New England.

The DELAWARE is small in bunch and berry, hardy and of fine quality. It is too small for a market fruit, but is indispensable in the garden.

The UNION VILLAGE has a large berry of good flavor, but is tender, is killed to the ground every winter, unless protected. It is a strong grower, and ripens its fruit about the same time with the Isabella.

DRACUT AMBER. This is a new seedling raised by Mr. Clement, of Dracut; it is early, excellent for jelly, and said to make a good wine, and is perfectly hardy.

ROGERS' HYBRIDS, Nos. 4 and 15. These grapes were raised by Mr. Rogers, of Salem, from the native grape, hybridized with the Black Hamburg. They are said to be hardy and of fine quality; they are now for sale, and will soon be better known.

There are still other grapes which might be mentioned, but some of them are known to be tender, and others, which are as yet so little known, that your committee defer mention of them until further trial. The Catawba and Isabella are not suited to general cultivation in New England. We recommend for general cultivation the Concord, the Delaware, and the Hartford Prolific, and as promising well, and worthy of trial, the Hybrids of Mr. Rogers, and for wine and jellies the Dracut Amber. The other varieties are more suitable for the amateur, and the garden, or the side of the house, for the present at least. Some of them may prove valuable for vineyard culture, on further acquaintance.

EPHM. W. BULL,
JABEZ FISHER,
ASA CLEMENT,
Committee of the Board.

THE SHEEP LAW.

The law for the protection of sheep, lambs and other animals, against the ravages of dogs, has been strictly enforced in some towns and comparatively disregarded in others. The neglect to enforce it in some cases, and the obstacles, interposed by officers of towns, to a full and prompt settlement for losses occurring to sheep owners in others, prevent many from engaging in sheep husbandry, notwithstanding the great inducements which the high prices of wool and mutton offer the farmer.

It must be apparent that the duties on wool will make it impossible for foreign manufacturers to compete with us in the coarser woollen fabrics, and that the price of wool, adapted to such fabrics, must rule high for some years. Sheep, therefore, will pay better than dogs. Indeed, it can be shown that, with judicious management, and with proper security against the dog risk, they pay better than any other animal on the farm.

I am indebted to the politeness of the town clerks of most of the towns in the Commonwealth for statistics upon this subject by which it appears that the number of dogs licensed in the

State is 21,385, the amount received for the same, $23,404.20, and the estimated number still unlicensed, 12,640.

The following Table, arranged by counties and towns, contains the returns made to this office giving the number of dogs licensed, the amount paid in, and the estimated number unlicensed.

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
Barnstable Co.			
Barnstable, . .	95	$95 00	–
Brewster, . .	25	25 00	–
Chatham, . .	3	3 00	50
Dennis, . .	–	–	75
Eastham, . .	–	–	45
Falmouth, . .	56	56 00	50
Harwich, . .	5	5 00	100
Orleans, . .	1	1 00	100
Provincetown, .	2	2 00	125
Sandwich, . .	146	150 00	–
Truro, . .	–	–	20
Wellfleet, . .	2	2 00	100
Yarmouth, . .	7	7 00	100
Totals, . .	342	$346 00	765
Berkshire Co.			
Adams, . . .	186	$198 00	150
Alford, . .	24	24 00	–
Becket, . .	62	62 00	10
Cheshire, . .	–	–	–
Clarksburg, .	19	19 00	20
Dalton, . .	44	44 00	3
Egremont, . .	44	39 60	20
Florida, . .	12	12 00	7
Gt. Barrington, .	111	111 00	56
Hancock, . .	21	21 00	4
Berksh.—*Con.*			
Hinsdale, . .	42	$42 00	25
Lanesborough, .	62	70 00	10
Lee, . . .	91	101 00	20
Lenox, . .	48	48 00	20
Monterey, . .	30	30 00	6
Mt. Washington,	–	–	20
New Ashford, .	20	20 00	3
New Marlboro',	1	1 00	–
Otis, . . .	35	35 00	15
Peru, . .	26	26 00	26
Pittsfield, . .	13	13 00	200
Richmond, .	35	35 00	6
Sandisfield, .	60	60 00	40
Savoy, . .	–	–	45
Sheffield, . .	–	–	–
Stockbridge, .	45	45 00	10
Tyringham, .	20	20 00	5
Washington, .	–	–	75
W. Stockbridge,	51	51 00	14
Williamstown, .	119	124 00	7
Windsor, . .	2	2 00	40
Totals, . .	1,223	$1,253 60	591
Bristol Co.			
Acushnet, . .	23	23 00	5
Attleborough, .	232	232 00	10

CITIES AND TOWNS.	No. Licensed.	Amount received.	Estimated No. unlicensed.
BRISTOL—*Con.*			
Berkley,	30	$30 00	–
Dartmouth,	136	136 00	15
Dighton,	46	50 00	–
Easton,	93	101 00	2
Fairhaven,	84	96 00	*
Fall River,	156	156 00	–
Freetown,	11	11 00	100
Mansfield,	91	99 00	5
New Bedford,	246	262 00	400
Norton,	92	96 00	–
Pawtucket,	–	–	–
Raynham,	84	88 00	2
Rehoboth,	113	117 00	10
Seekonk,	52	52 00	–
Somerset,	7	7 00	70
Swanzey,	68	68 00	5
Taunton,	230	234 00	400
Westport,	79	79 00	25
Totals,	1,873	$1,937 00	1,049
DUKES COUNTY.			
Chilmark,	4	$4 00	15
Edgartown,	42	41 00	10
Tisbury,	7	7 00	75
Totals,	53	$52 00	100
ESSEX COUNTY.			
Amesbury,	39	$39 00	10
Andover,	116	116 00	†
Beverly,	162	170 00	20
Boxford,	51	51 00	–
Bradford,	49	61 00	6

CITIES AND TOWNS.	No. Licensed.	Amount received.	Estimated No. unlicensed.
ESSEX—*Con.*			
Danvers,	101	$100 00	–
Essex,	31	31 00	5
Georgetown,	59	63 00	10
Gloucester,	289	321 00	150
Groveland,	15	15 00	‡
Hamilton,	31	35 00	2
Haverhill,	178	202 00	100
Ipswich,	99	111 00	50
Lawrence,	247	277 00	100
Lynn,	280	300 00	§
Lynnfield,	30	30 00	–
Manchester,	20	20 00	30
Marblehead,	6	6 00	100
Methuen,	88	100 00	4
Middleton,	44	44 00	–
Nahant,	2	2 00	15
Newbury,	21	21 00	25
Newburyport,	191	235 00	50
N. Andover,	77	85 00	10
Rockport,	75	75 00	5
Rowley,	25	25 00	–
Salem,	75	150 00	100
Salisbury,	74	74 00	2
Saugus,	72	72 00	3
South Danvers,	127	131 00	–
Swampscott,	37	78 00	–
Topsfield,	57	57 00	10
Wenham,	40	40 00	2
West Newbury,	64	64 00	*
Totals,	2,872	$3,201 00	799

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* Very few.

† "Perhaps half as many more."

‡ No means of estimating, probably twenty.

§ Not estimated.

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
Franklin Co.			
Ashfield, . .	30	$30 00	–
Bernardston, .	32	36 00	–
Buckland, . .	60	64 00	–
Charlemont, .	–	–	–
Coleraine, . .	57	57 00	30
Conway, . .	15	15 00	35
Deerfield, . .	96	100 00	20
Erving, . .	20	20 00	6
Gill, . . .	7	7 00	15
Greenfield, . .	83	83 00	50
Hawley, . .	8	8 00	10
Heath, . .	6	6 00	50
Leverett, . .	40	40 00	5
Leyden, . .	16	16 00	12
Monroe, . .	1	1 00	3
Montague, . .	61	61 00	–
New Salem, .	29	37 00	–
Northfield, . .	–	–	–
Orange .	57	65 00	–
Rowe, . .	28	28 00	–
Shelburne, . .	39	39 00	10
Shutesbury, .	–	–	–
Sunderland, .	26	26 00	3
Warwick, . .	34	34 00	*
Wendell, . .	–	–	–
Whately, . .	1	1 00	60
Totals, . .	736	$774 00	309
Hampden Co.			
Agawam, . .	34	$34 00	30
Blandford, . .	66	66 00	–
Hampden—*Con.*			
Brimfield, . .	58	$58 00	4
Chester, . .	39	39 00	20
Chicopee, . .	85	89 00	75
Granville, . .	49	49 00	–
Holland, . .	15	15 00	–
Holyoke, . .	75	79 00	125
Longmeadow, .	43	43 00	20
Ludlow, . .	35	35 00	30
Monson, . .	33	33 00	100
Montgomery, .	–	–	–
Palmer, . .	37	37 00	100
Russell, . .	18	18 00	6
Southwick, .	43	47 00	35
Springfield, .	490	741 00	†
Tolland, . .	36	40 00	6
Wales, . .	1	1 00	12
Westfield, . .	–	–	–
W. Springfield,	60	68 00	30
Wilbraham, .	78	82 00	2
Totals, . .	1,295	$1,574 00	595
Hampshire Co.			
Amherst, . .	102	$110 00	–
Belchertown, .	65	65 00	100
Chesterfield, .	–	–	25
Cummington, .	–	–	50
Easthampton, .	56	60 00	25
Enfield, . .	9	9 00	91
Goshen, . .	2	2 00	‡
Granby, . .	26	26 00	–
Greenwich, .	–	–	30

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* Not one. † Very few. ‡ One-tenth.

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
Hampsh.—*Con.*			
Hadley, . .	52	$52 00	–
Hatfield, . .	2	2 00	25
Huntington, .	46	54 00	1
Middlefield, .	2	2 00	30
Northampton, .	36	40 00	300
Pelham, . .	21	21 00	12
Plainfield, . .	–	–	30
Prescott, . .	–	–	50
South Hadley, .	83	95 00	–
Southampton, .	31	31 00	10
Ware, . .	–	–	–
Westhampton, .	28	31 00	*
Williamsburg, .	78	86 00	3
Worthington, .	7	7 00	40
Totals, . .	646	$693 00	822
Middlesex Co.			
Acton, . .	58	$58 00	–
Ashby, . .	1	1 00	200
Ashland, . .	–	–	–
Bedford, . .	3	7 00	45
Belmont, . .	56	60 00	6
Billerica, . .	37	37 00	60
Boxborough, .	–	–	30
Brighton, . .	–	–	–
Burlington, .	27	35 00	1
Cambridge, .	536	564 20	550
Carlisle, . .	22	22 00	–
Charlestown, .	170	182 00	400
Chelmsford, .	116	128 00	–
Concord, . .	56	56 00	–
Mid'sex—*Con.*			
Dracut, . .	85	$85 00	†
Dunstable, .	13	13 00	20
Framingham, .	218	264 00	10
Groton, . .	11	11 00	100
Holliston, . .	96	96 00	–
Hopkinton, .	–	–	–
Lexington, .	3	3 00	140
Lincoln, . .	15	15 00	17
Littleton, . .	32	32 00	2
Lowell, . .	463	523 00	200
Malden, .	238	239 00	100
Marlborough, .	171	191 00	50
Medford, . .	192	224 00	50
Melrose, . .	113	125 00	‡
Natick, . .	136	144 00	50
Newton, . .	13	13 00	300
Reading, . .	84	96 00	–
North Reading,	53	53 00	–
Pepperell, . .	3	3 00	120
Sherborn, . .	75	79 00	–
Shirley, . .	6	6 00	30
Somerville, .	–	–	
South Reading,	114	142 00	1
Stoneham, .	118	122 00	35
Stow, . .	55	63 00	3
Sudbury, . .	65	69 00	10
Tewksbury, .	33	33 00	15
Townsend, .	90	90 00	10
Tyngsborough, .	37	41 00	5
Waltham, . .	241	265 00	‡

* Not one. † Not any. ‡ Very few.

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
MID'SEX—*Con.*			
Watertown,	36	$36 00	50
Wayland,	58	58 00	–
W. Cambridge,	147	155 00	1
Westford,	89	89 00	–
Weston,	8	16 00	50
Wilmington,	–	–	–
Winchester,	32	32 00	100
Woburn,	183	203 00	50
Totals,	4,328	$4,777 20	2,811
NANTUCKET CO.			
Nantucket,	22	$22 00	50
NORFOLK CO.			
Bellingham,	–	–	–
Braintree,	116	120 00	12
Brookline,	69	84 00	200
Canton,	112	121 00	*
Cohasset,	67	67 00	15
Dedham,	20	20 00	200
Dorchester,	148	152 00	400
Dover,	1	5 00	40
Foxborough,	104	120 00	–
Franklin,	53	61 00	15
Medfield,	44	56 00	3
Medway,	118	118 00	–
Milton,	89	105 00	50
Needham,	19	19 00	100
Quincy,	66	66 00	500
Randolph,	248	248 00	100
Roxbury,	330	355 00	600
Sharon,	81	97 00	–

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
NORFOLK—*Con.*			
Stoughton,	185	$201 00	30
Walpole,	9	9 00	100
West Roxbury,	319	367 00	25
Weymouth,	269	292 00	50
Wrentham,	105	109 00	35
Totals,	2,570	$2,852 00	2,525
PLYMOUTH CO.			
Abington,	–	–	–
Bridgewater,	113	$125 00	*
Carver,	36	40 00	6
Duxbury,	65	69 00	–
E. Bridgewater,	76	92 00	–
Halifax,	13	13 00	1
Hanover,	12	12 00	60
Hanson,	28	28 00	2
Hingham,	139	139 00	10
Hull,	6	6 00	4
Kingston,	60	60 00	–
Lakeville,	66	80 00	–
Marion,	2	6 00	36
Marshfield,	33	33 00	23
Mattapoisett,	10	10 00	65
Middleborough,	129	129 00	7
N. Bridgewater,	115	119 00	25
Pembroke,	32	32 00	10
Plymouth,	180	184 00	–
Plympton,	–	–	25
Rochester,	–	–	–
Scituate,	56	56 00	9
South Scituate,	56	60 00	–

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* "Unknown."

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
Plym'th—*Con.*			
Wareham, . .	–	–	300
W. Bridgewater,	45	$53 00	25
Totals, . .	1,272	$1,346 00	608
Suffolk Co.			
Boston,* . .	904	$1,036 00	300
Chelsea, . .	123	131 00	120
North Chelsea, .	–	–	60
Winthrop, . .	2	2 00	10
Totals, . .	1,029	$1,169 00	490
Worcester Co.			
Ashburnham, .	4	$44 00	†
Athol, . .	–	–	–
Auburn, . .	47	47 00	–
Barre, . .	112	116 00	10
Berlin, . .	35	39 00	1
Blackstone, .	45	45 00	30
Bolton, . .	74	74 00	6
Boylston, . .	39	39 00	–
Brookfield, . .	26	30 00	20
Charlton, . .	100	116 00	3
Clinton, . .	92	100 00	–
Dana, . .	–	–	–
Douglas, . .	97	105 00	10
Dudley, . .	65	65 00	–
Fitchburg, . .	153	165 00	–
Gardner, . .	3	3 00	95
Grafton, . .	92	96 00	4
Hardwick, . .	2	2 00	100
Harvard, . .	1	1 00	‡
Holden, . .	40	44 00	§
Worcest.—*Con.*			
Hubbardston, .	58	$62 00	14
Lancaster, .	41	41 00	25
Leicester, . .	–	–	–
Leominster, .	85	85 00	–
Lunenburg, .	48	48 00	–
Mendon, . .	–	–	–
Milford, . .	21	25 00	500
Millbury, . .	–	–	–
New Braintree, .	34	38 00	8
Northborough, .	–	–	–
Northbridge, .	90	102 00	–
N. Brookfield, .	50	50 00	–
Oakham, . .	23	23 00	18
Oxford, . .	106	118 00	1
Paxton, . .	16	18 40	10
Petersham, .	48	48 00	–
Phillipston, .	27	27 00	–
Princeton, .	46	46 00	–
Royalston, .	33	33 00	–
Rutland, . .	2	2 00	50
Shrewsbury, .	69	81 00	2
Southborough, .	67	67 00	–
Southbridge, .	77	85 00	15
Spencer, . .	81	81 00	–
Sterling, . .	65	68 00	90
Sturbridge, .	66	70 00	8
Sutton, . .	84	96 00	–
Templeton, .	51	51 00	–
Upton, . .	–	–	–
Uxbridge, .	24	24 00	–

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* Killed, 781.

† Not any.

‡ "Good many."

§ Ten or fifteen.

Cities and Towns.	No. Licensed.	Amount received.	Estimated No. unlicensed.
Worcest.—*Con.*			
Warren, . .	57	$57 00	15
Webster, . .	12	12 00	–
Westborough, .	82	94 00	10
West Boylston, .	54	58 00	30
W. Brookfield, .	32	32 00	10
Worcest.—*Con.*			
Westminster, .	39	$43 00	6
Winchendon, .	59	64 00	–
Worcester, .	691	791 00	100
Totals, . .	3,124	$3,408 00	1,126

The Board of Agriculture met on the 9th, 10th, and 11th days of December, to hear the reports of delegates appointed to visit the exhibitions of the various agricultural societies. These reports will be found on a subsequent page.

The committee appointed at the meeting of February 26, 1862, to consider and report some plan of securing more uniform returns from the agricultural societies, submitted the following blank to be furnished by each society, to be filled up by competitors for premiums on crops:—

AGRICULTURAL SOCIETY.

Statement concerning a crop of , *raised by Mr.* , *in the town of* , 1863.

What was the crop of 1861?

What manure was used, and how much?

What was the crop of 1862?

What manure was used, and how much?

What is the nature of the soil?

When, and how many times ploughed, and how deep?

What other preparation for the seed?

Cost of ploughing and other preparation?

Amount of manure, in loads of thirty bushels, and how applied?

Value of manure upon the ground?

When and how planted, and the amount and kind of seed?

Cost of seed and planting?

How cultivated, and how many times?

Cost of cultivation, including weeding and thinning?

Time and manner of harvesting?

Cost of harvesting, including the storing and husking or threshing?

Amount of straw, stover, or other product?

REMARKS.

Signed by

Competitor.

From personal observation, we hereby certify that the above answers are true.

From actual measurement, I hereby certify that the land which the above crop of covered, contained rods, and no more.

I hereby certify that the weight of the above crop, as ascertained by me, on the day of , was pounds.

Committee.

In ascertaining the amount of a crop, an average rod shall be selected, harvested and weighed by one or more members of a committee, and the whole estimated by multiplying it by the number of rods; or the whole crop may be measured in any vessel and the weight of its contents once, multiplied by the number of times it is filled by the crop; and the committee in their certificate, or their report, shall state which method was employed.

The certificate shall state the weight of all crops only when in a merchantable state.

RULES OF MEASURE,

Practiced and adopted by the State Board of Agriculture.

Wheat, potatoes, sugar beets, mangel wurzel, ruta-bagas, white beans, and pease, . .	60 lbs. to the bushel.
Corn, rye, . .	56 " " "
Oats, . . .	32 " " "
Barley, buckwheat, .	48 " " "
Cracked corn, corn and rye and other meal, except oat, and Eng. turnips,	50 " " "
Parsnips, . . .	45 " " "
Carrots, . . .	55 " " "
Onions, . . .	52 " " "

This blank was adopted as one of the requirements of the Board on the part of the agricultural societies.

At this meeting a committee of three, consisting of Messrs. Loring, Stedman and Davis, was appointed to ascertain whether any uniform plan of improvement can be adopted by the agricultural societies of the State, and to report the same if any; also to consider whether any plan can be adopted to give additional efficiency, and to improve the organization of the State Board of Agriculture, and to report the same, if any.

At the annual meeting held at the State House in Boston, January 13th, 14th, 15th, and 16th, this committee submitted the following

REPORT:

The committee to whom was referred the question of increasing the efficiency of the State Board of Agriculture, and of establishing some uniform system for the management of agricultural societies in the State, would respectfully report:

The Act establishing a State Board of Agriculture, provides, after setting forth how it shall be constituted, and when it shall hold its meetings, that:—

> "Section 4. They may appoint and prescribe the duties of a secretary of the board, who shall receive a salary of two thousand dollars a year; and who at such times as the board approve may employ a clerk at a salary not exceeding six hundred dollars a year.
>
> "Section 5. They shall investigate such subjects relating to improvement in agriculture in this State, as they think proper, and may take, hold in trust, and exercise control over, donations or bequests made to them, for promoting agricultural education, or the general interests of husbandry.
>
> "Section 6. They may prescribe forms for and regulate the returns required of the different agricultural societies, and furnish to the secretary of each, such blanks as they deem necessary to secure uniform and reliable statistics."

These three sections contain all the definition that can be found of the duties of the Board, and constitute the chief object which the Board has thus far had in view.

We cannot refer to the history of the Board, without expressing our gratification at what has already been accomplished. Its organization was the result of long and unwearied effort on the part of many intelligent and influential citizens of the Commonwealth, all of whom had a personal interest in the cause of agriculture, and some of whom had contributed largely to the agricultural literature of the country. Not with any very definite idea of the duties which would devolve upon this body, nor of the work which it might accomplish, but with confidence that it would stimulate agricultural enterprise, and diffuse agricultural information, those who were interested in this branch of business urged the organization of this Board.

With the work already accomplished, they and the community have every reason to be gratified. The collection of a valuable library, the establishment of a highly interesting museum, the annual issue of a condensed and carefully arranged volume, filled with information useful to every section of the State, added to the encouragement which agricultural societies and other associations have received, constitute the benefit which has thus far accrued. And it should be remembered that all this has been done with much industry, and with more skill than usually attends a wholly experimental enterprise.

The question now before us is, whether the operations of the Board can be extended, or modified, or re-arranged, in such a manner as to increase its usefulness and efficiency. If this is to be done at all, it may be done by connecting the Board more intimately with the various other organizations in the State, in such a manner as to give efficiency to its exertions for the improvement of agriculture, and for the general advancement of our people in knowledge and enterprise; and not by an assumption of power over the agricultural societies in the State. In the matter of agricultural education, can the State Board of Agriculture co-operate with the Board of Education, in presenting such education to the minds of youth in our common schools, or in organizing an agricultural college? In collecting facts of value to the farming community, can the various public institutions in the Commonweath, founded by the liberality of the legislature, and endowed with land from the same source, be called on to furnish information to the State Board of Agriculture, and to conduct experiments under its direction? Is there any method by which the Board of Agriculture can obtain an effectual hearing on questions brought before the legislature, relating to the various interests of farming, and to the organization of agricultural societies? Whatever can be done to give the Board position and influence in this way would add very materially to its usefulness.

With regard to the internal organization of the Board, and its plan of operations, there is no doubt that some advantageous changes may be made. Hitherto the whole business of the Board has been thrown upon the secretary, in such a way as to encumber him, and leave the Board ignorant in many respects of the work in which it is engaged.

From the tenor of the fifth section of the Act establishing the Board, it was evidently anticipated that property would pass into its hands either by donation, or bequest, or otherwise, to be used for the purposes of agricultural education, or the general interests of husbandry. Although no such state of things exists, still there are annual appropriations made for defraying the expenses of the Board, and to carry out such objects as they may recommend. It would seem proper therefore that a finance committee should be appointed, under whose supervision the appropriations should be expended, and who should recommend objects for which appropriations should be made; and that this committee should, through the secretary, make an annual report to the Board.

The library and museum have become extensive and valuable; and it would appear necessary that a committee should be appointed to aid the secretary in making an annual report of their condition, and to establish a system of exchanges of reports and documents with other societies, for the benefit of the members of the Board and of the societies which they represent.

A full report from the secretary with regard to the business of the department, would be very valuable, if made annually; and we would recommend that this be required; and that at the close of each session of the Board, the action and discussion of the meeting as reported by the secretary, be revised by a committee for the purposes of publication, with the understanding that all reports and votes be published in full, with as much of the debate which led to their adoption as possible.

The committee would recommend that the Board hold but one meeting annually, in Boston, commencing on Thursday of the week previous to the first Wednesday of February, and continuing to said Wednesday, at which time the new members take their seats, and the Board can be organized, committees appointed, reports finished, delegates appointed, and the business arranged for the new year. They would recommend also that an annual meeting for discussion and lectures, which leading agriculturists in the county shall be invited to attend, be held at such places in the Commonwealth as the Board may designate on the second Tuesday of December, and that a standing committee be appointed to make arrangements, by providing lecturers, &c., for such meeting.

With regard to the management of the societies, many difficulties lie in the way of any satisfactory changes. No doubt there is room for reform; but the system under which they operate has been so long in existence, and is based so entirely on the right of each society to regulate its own affairs in the main, that great trouble must necessarily attend any re-organization, or any attempt to make the societies uniform in their operations. The issue of rules and regulations which shall enable the societies to obtain systematic information with regard to cultivation, crops, cattle, &c., and to impart it to the Board and to the community is evidently a part of the duty of the Board. Any protection of their rights and interests which the societies may require should be furnished them. They should receive encouragement, and advice and suggestions with regard to offers of premiums. But it is evident that they must be left to manage their own finances, to organize their own government, to conduct their own exhibitions according to their own necessities and opportunities. The success of these societies depends very much upon the public spirit of the farmers which compose them, and public spirit is a virtue not to be created by regulations or enactments. Prosperity, peace, and liberality, combined with ordinary wisdom, are the foundation of an intelligent agricultural community, and of successful agricultural societies. When the State Board of Agriculture can distribute all these in large measure over the Commonwealth, its work will be more than half accomplished.

GEORGE B. LORING,
P. STEDMAN,
Committee.

This report was accepted and adopted, when it was

Voted, That a finance committee of three be appointed, under whose supervision the appropriations shall be expended, and who shall recommend objects for which appropriations shall be made; and that this committee shall, through the secretary, make an annual report to the Board.

The committee was constituted by the appointment of Messrs. Wilder, Loring, and Stedman.

Voted, That a committee of three be appointed to aid the Secretary in making an annual report of the condition of the museum and library, and to establish a system of exchanges of reports and documents with other societies for the benefit of the members of the Board and of the societies which they represent.

This committee was constituted by the appointment of Messrs. Stockbridge, Stedman, and Bull.

Voted, That a committee of three be appointed to assist the Secretary in revising the report of the action of the Board at its various meetings, for the purpose of publication, and to arrange all reports and votes for publication, with so much of the debate as may seem valuable.

Messrs. Phinney, Lathrop, and Stockbridge was appointed as this committee.

Voted, That the State Board of Agriculture hold but one business meeting annually in Boston, commencing on Tuesday of the week previous to the first Wednesday of February of each year, and continuing to said Wednesday; at which time the new members may take their seats, and the meeting be prolonged as the business may require.

Voted, That also an annual meeting for discussion and lectures, which leading agriculturists in the county shall be invited to attend, be held at such places in the Commonwealth as the Board may designate, on the second Tuesday in December, and that a standing committee of three be appointed to make arrangements, by providing lecturers, &c., for such meeting. At this meeting any business which may come before the Board may be transacted.

The standing committee was constituted by the appointment of Messrs. Brooks, Loring, and Wilder, and the Secretary of the Board was added as a member *ex officio*.

At the same meeting it was also

Voted, That the State Board of Agriculture are under special obligations to His Excellency the Governor, for the valuable suggestions upon the subject of agriculture contained in his Annual Address to the

Legislature, and that a committee of three be appointed to co-operate with him in any measures adopted to carry his suggestions into practical operation.

Messrs. Loring, Wilder, and Brooks were nominated and appointed to constitute the committee. Subsequently Messrs. Lathrop and Phinney were added to this committee.

It was also

Voted, That Messrs. Lathrop and Smith be added to the committee on the cattle disease in place of Messrs. Peters and Walker, whose terms expire, and that the committee (now consisting of Messrs. Stedman, Lathrop, and Smith) be requested to use their influence to have the cattle commission continued.

The Secretary was appointed a delegate from the State Board of Agriculture to attend the International Exhibition at Hamburgh, in July, 1863.

On motion of Mr. Sewall it was

Resolved, That we have received with regret an annunciation of the retirement from this Board, of our distinguished associate, James S. Grennell, Esq., and that our regret is relieved only by the fact that he now occupies a position of high honor and usefulness in the National Bureau of Agriculture, at Washington, and by the remembrance of his services to the community in his official capacity as a member of the Board, and of his uniform urbanity and affability in his intercourse with all his associates here.

Resolved, That we tender to the Hon. James S. Grennell, our late associate at this Board, the assurance of our cordial respect and esteem, and of our great satisfaction in the prospect of his continued services to the cause of agriculture in the position which he now occupies at Washington.

It was also

Resolved, That this Board entertain the utmost confidence in the usefulness of the National Bureau of Agriculture, at Washington, and that we anticipate highly beneficial results to the interests of agriculture from the operations of this department of the government.

Mr. FRANCIS G. SANBORN, Curator of Entomology in the State Cabinet connected with this office, presented to the Board the following paper, which it was voted to accept and print, upon some of the

INSECTS OF MASSACHUSETTS WHICH ARE BENEFICIAL TO AGRICULTURE.

The science of Entomology or the Natural History of Insects may for our present purpose be divided into two sections, Technical, and Economical Entomology; the first is of such fascinating interest as to have enlisted some of the most powerful intellects, and indefatigable laborers in every age, and while the results of this have increased the amount of human knowledge in no small degree, they have rendered the task much easier of him who attempts to pursue the study in the latter and more practical relation.

From the vast number of species, their variations of form and structure, and the protean transformations which they undergo, the simplest system of classification must necessarily be somewhat complex; this fact no less than the apparent insignificance of the subject has deterred and discouraged the student, and brought upon him, not in times *past* alone, contempt and ridicule.

Ignorance of nature's laws will not prevent their execution, and we find that if we have neglected or broken them, be it never so unwittingly, we must either suffer the penalty, or possess ourselves of the requisite information, and means to avert it. In the progress of civilization and the introduction of new arts and sciences, as is so clearly stated by Dr. Harris in the opening chapter of his Treatise, the balance originally existing between plants and insects, and between the latter and other animals has been destroyed. "Deprived of their natural food by the removal of the forest trees and shrubs, and the other indigenous plants that once covered the soil, insects have now no other resource than the cultivated plants that have taken the place of the original vegetation. The destruction of insect-eating animals, whether quadrupeds, birds, or reptiles, has doubtless tended greatly to the increase of insects." But we find in the course of our studies that not *all* insects are vegetable feeders; that some seem appointed to prey exclusively upon others, and endowed with the power to keep in check the noxious tribes by destroying and feeding upon them. Others again appear "nature's special police" designed to remove from the surface of the earth all decaying substances which not only offend the senses, but also pollute the atmosphere, and impregnate it with the seeds of disease and death; others contribute in a greater or less degree to the comforts and luxuries of mankind. It is of the first or *insectivorous* species that I propose to treat in the following pages.

The intelligent farmer has learned that the birds are his friends and lay him under greater obligations by destroying injurious insects than the theft of a few cherries and kernels of corn, or the drilling a few holes in the bark of his trees, will cancel: he will protect if he does not cultivate the toad, the frog, and the harmless snakes of our nothern climate. But he will scarcely make distinctions in the ranks of the insects.

The predacious ground-beetle that is discovered in the furrow, in his search after grubs and caterpillars, is as likely to be trodden under the ploughman's boot, as is his destined food, the cutworm. Within the past year or two many complaints have been heard, of the little red "bugs" that swarmed on the rye, wheat and oats, and were supposed to be feeding upon those grains, but which on examination proved to be "lady-birds," or small scarlet beetles of the insectivorous class, subsisting almost entirely on the *Aphis*, or plant-louse, which was the real enemy of the crop. These are but solitary instances of the danger of mistaking an extremely useful and valuable assistant for a noxious species, and treating him accordingly.

It is with a view to furnish information by which we can distinguish insects of the former class, and exempt them from the general war of extermination, that the present essay has been undertaken. And inasmuch as we shall be obliged to draw somewhat from the vocabulary of *technical* science, it may not be amiss to give in this place an explanation of some of the terms, most of which will be met with in every treatise on this subject. Although these may be familiar to many of our readers, experience proves the necessity of such a plan to others.

The most obvious points of an insect, when closely examined, are, 1st, the *head*, to which are attached the *antennæ*, or horns, the *eyes*, and the *mouth*, or eating apparatus; 2d, the *thorax*, to which are attached the *wings* and the *feet;* 3d, the *abdomen*, which is composed of several *segments*, or joints, and contains usually concealed in its interior the *ovipositor*, or other organs of generation, the *intestines*, and their vent, or *anus*; the *abdomen* is almost or entirely covered by the *wings* in some insects when in a state of repose. Every insect as a rule has *two antennæ*, *six feet*, and *four wings*; the *antennæ* are sometimes very small and scarcely visible without the aid of a magnifier, as in the case of some beetles, dragonflies, bugs, and flies; the *feet* are in some beetles folded so closely into corresponding hollows in the under surface, when not in use, as to be almost invisible, and the fore-pair in some butterflies are so weak and unarmed with claws, as to have received the name of *spurious*, while the *wings* differ so greatly in their form, size and structure, in the various Orders, as to have given names founded upon this circumstance to those Orders. Thus in the beetles we find the *fore-wings* thickened and hardened so as to resemble the substance of the *head* and *thorax*, and serving merely as coverings or sheaths to the *hind-wings*, which are folded under them when not in use. This Order has received the name of COLEÓPTERA, from two Greek words, meaning *sheathed-wings*.

In the locusts and crickets, the *fore-wings*, although not so hard and stiff as in the beetles, are still of different and more substantial structure than the *hind-wings*, which are folded, not by bending in the middle like those of the beetles, but in straight longitudinal furrows like those of a fan. The Order to which the crickets, locusts, &c., belong, has received the name ORTHÓPTERA, from two Greek words signifying *straight wings*.

In the Order containing the bugs, &c., we find still another form of the *fore-wings*, which are stiff and hard like those of beetles, for about half their length from the body, while the remaining half is thin and flexible, resembling the texture of the *hinder pair*; from this circumstance the Order has received the name HEMÍPTERA, from two Greek words signifying *half-wings*.

The dragonflies and darning-needles are furnished with wings of which the fore-pair more closely resemble the hinder, than in any other Order, both being constructed of a thin glassy membrane, very finely *reticulated*, or covered with a network of veins or *nerves*. The Order which includes these insects has accordingly received the name of Neuróptera, also from the Greek, signifying *nerve-wings*.

The Order containing the wasps and bees having membranous wings, of which the hind pair is generally the smallest, but neither furnished with so fine a network of nerves as in the preceding Order, has been called Hymenóptera, from two Greek words, meaning *membrane wings*.

In the flies we find the *hind-wings* so diminished in size as to be scarcely visible, or at least mere shrunken appendages occupying the *place* of *wings*, and bearing no resemblance to the anterior ones, so that the insect is commonly said to have but *one* pair, and from this feature the Order is known as Díptera, a name given it by Aristotle, from the Greek *dis*, meaning two, and *ptera*, wings.

Butterflies and moths have their membranous wings in general completely covered with scales, so as to conceal the surface in which they are planted ; these scales are formed somewhat like those of the fishes, and are arranged in parallel rows, overlapping each other so as to shed moisture, being attached by a projection at their base, which enters the substance of the wing. From the Greek words *Lepis*, a scale, and *ptera*, wings, they are called Lepidóptera.

Figure 1, represents some of the distinguishing characteristics of this order, which are given here only for the purpose of comparison, as none of the species belonging to it are beneficial to agriculture, but quite the reverse. A, the knobbed *anténna* of a butterfly, of the form called *cápitate ;* B, the *palpus*, plural *palpi*, of which there are two, curving upward from beneath the head, and between which the tongue or sucker, C, is coiled when not in use ; C, the tongue or sucker partially unrolled ; this form is peculiar to the *Lepidóptera ;* D, the compound eye, composed in all insects of numerous small eyes ; E, a short piece cut from the tongue and magnified, to show that it is a double tube ; F, a part of the wing of a moth or butterfly, showing the scales, and mode of arrangement ; the two scales at the upper right corner show the stalks or projections, which are inserted in corresponding sockets in the membrane ; these sockets are represented in the cut by the round dots ; G, is a common form of *anténna* among

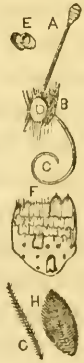

Fig. 1.

moths, called *sétiform* or bristle-shaped, with fine *cilia* or hairs, two on each joint; H, another form of *anténna*, called doubly *péctinate*, or furnished with teeth like those of a comb, on both sides.

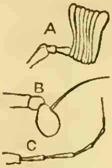

Fig. 2.

Figure 2, represents other forms of *antennæ*, considerably magnified. A, *lamellate*, or composed of leaves, *antenna* of a beetle, *Polyphylla variolósa;* B, three-jointed *antenna*, of which the third joint is *reniform* or kidney-shaped, and furnished with a bristle, *antenna* of fly, *Syrphus;* C, *setiform* or bristle-shaped, *antenna* of dragonfly, *Libéllula.*

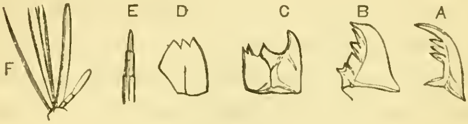

Fig. 3.

Figure 3, different forms of *mándibles*, or outer jaws, and *haustélla*, or suckers, magnified. A, *mandible* of *Cicindéla purpúrea*, or purple tiger-beetle, *Coleópterous;* B, *mandible* of *Phyllóptera*, or green grasshopper, *Orthópterous;* C, *mandible* of *Libéllula trimaculáta*, or three-spotted dragonfly, *Neurópterous;* D, *mandible* of *Vespa maculáta*, or paper-making wasp, "hornet," *Hymenópterous;* E, *Rostrum* or jointed sucker of *Címex lectulárius*, "bed-bug;" F, *Probóscis* or sucker of a mosquito, *Culex.* The short jointed instrument at the extreme right is the *palpus*, the next and longer piece the lower lip, in which the lancets are sheathed; to the left of this are the four slender piercing instruments, the two middle ones being the finest, and appear in the cut as one piece split at the tip, the two outer ones are very finely *serrate* or barbed on one of their edges; the piece on the left is the upper lip, which covers and protects the delicate piercing apparatus when sheathed.

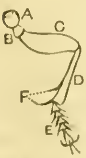

Fig. 4.

Figure 4, exhibits the leg of a ground-beetle of the genus *Hárpalus.* A, the *Cóxa*, or hip, which fits into a corresponding socket in the under part of the *thorax;* B, the *trochánter*, or joint between the hip and the thigh; C, the *fémur*, or thigh, which is generally the largest joint and extends beyond the sides of the body; D, the *tíbia*, or shank, which is frequently furnished with spines or spurs toward the tip, as shown at F; E, the *tarsus*, or foot, which varies in the numbers of joints in different insects from two to five, and the last joint is furnished usually with two claws at its tip; in some insects it has only one, however, and in a few others they appear to be wanting.

[Note.—Many of the organs of insects are so concealed within other parts as to be unnoticed by the general observer; of these an explanation will be given in cases where it becomes necessary to refer to them. The names of *genera* and *species* will also be defined where it is practicable, and the appropriateness of these, in general, will be obvious; it is however to be regretted, that some few names, either arbitrary or of obscure derivation, have been applied without sufficient pertinence to make them characteristic of the individuals which they represent. Long association and usage, however, render it undesirable if not impossible, to change them, and we can only endeavor in the present to avoid the faults of our predecessors, and explain what we may of the technicalities; leaving the barbarous and crabbed nomenclature of the fathers of the science, as a partial excuse for students of later date who have so far exhausted their descriptive vocabularies, as to have recourse to naming objects of nature in honor of some more or less celebrated naturalist, patron, or friend.]

GLOSSARY.

Abdomen. The hinder part of the body.

Antènna, plural, *Anténnæ.* (From the Latin, meaning the yards of a vessel.) "Horns," or jointed organs of insects, situated on the head.

Antérior. The front or foremost member, or part of any member. *Posterior.* The hinder part; opposite of anterior.

Anus. The vent, or fundament. *Anal.* Belonging to the anus.

Apex. The point farthest from the body; the tip.

Article. A joint; used generally of the *antennæ.* *Articulated.* Composed of articles.

Base. The point nearest to the body, or centre. *Basal.* Pertaining to the base.

*Breadth.** The greatest distance across the body from side to side.

Cell, or *Cellule.* A portion of a wing, surrounded by nerves or veins.

Cónfluent. Running together; a meeting of two lines.

Costa. A rib. *Costal.* Pertaining to the rib, or thickened anterior margin of the wing.

Elýtron, plural *Elýtra.* The hard fore-wing, or wing-sheath of a beetle.

Eyes. Organs of vision, composed of a vast number of simple lenses of a six-sided form, and situated on each side of the head.

Feet. Generally used in Entomology for legs, the feet proper being called *tarsi.*

Fulvous. Tawny; reddish or brownish yellow.

Fuscous. Dark brown, or blackish, sometimes tinged with gray.

Iridéscent. Reflecting the colors of the rainbow.

Lábrum. The piece covering the mandibles; the upper lip.

Lenticular. Of thickened, somewhat oval form; bean-shaped.

Lunule. A spot or marking resembling in form a crescent or new moon.

*Length.** (When not otherwise specified.) The distance from the tip of the mandibles to the apex of the abdomen.

Océlli. Simple eyes, between the *compound* eyes, on the upper part of the head.

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* Measurements of insects are usually given in tenths or hundredths of an inch.

Pedúncle, *pédicle*, or *pédicel.* A stem or foot-stalk connecting two parts, or supporting a segment.

Scutel. A small piece of somewhat triangular form, between the bases of the wings.

Segment. A joint or section; used generally with respect to the *abdomen.*

Serrate. With projections like the teeth of a saw.

Stigma. A mark, or spot; generally used for an almost universal mark on the fore-wing of some Orders.

Sub. A prefix giving the meaning of "nearly but not quite;" as *sub*triangular—almost triangular.

Suture. A seam, or place of union between two parts, usually admitting of motion.

Thorax. The segment of the body to which the wings and feet are attached, consisting of three parts—the *Prothorax*, *Mesothorax*, and *Metathorax*, or front, middle, and hind thorax; the latter in some Orders projects some distance beneath the abdomen.

Tégula. A small scale covering the basal joint of fore-wing in the Order *Hymenóptera.*

Venter. The belly; the under part of the abdomen. *Ventral.* Pertaining to the *venter.*

Vertex. The top, the upper part; used generally of the head.

Villose. Thickly clothed with short hairs.

Worm. Properly a ringed animal, without *vertebræ* and having no *antennæ*, *no voice*, *no legs*, no true blood and *no distinct head.* Used in common language however, to denote the *larvæ* or young of some insects.

Every insect is hatched from an egg, but when first produced is called a *lárva*, plural, *lárvæ;* (the caterpillar is the *lárva* of a moth, or a butterfly, the grub is the *lárva* of a beetle, the maggot is the *lárva* of a fly.) This *lárva* commences to eat voraciously, and increases rapidly in size, changing its skin or moulting at frequent intervals until a certain time, when it casts off not only the skin but also its former head and feet and is now called a *púpa*, plural *púpæ;** (the *chrýsalis* is the *púpa* of a butterfly.) In this state it no longer eats, but remains almost motionless for a longer or shorter period, when it casts off the skin for the last time, and appears in its final and perfect form called the *imágo*, plural *imágines;* (all winged or adult insects are *imágines.*) It has now ceased growing, and its only object is to seek out its mate, and prepare for a succession of offspring; most insects live but a few days and others a few hours after arriving at this point, the majority requiring little or no food during this condition of existence.*

The modern system of classification is based upon the anatomical structure of the *imágo*, as well as the nature of the metamorphoses or changes through which it has passed. Under this system the simplest and most natural arrangement comprises seven Orders, which are popularly distinguished as: 1st. Beetles; 2d. Cockroaches, crickets, grasshoppers, &c.; 3d. Dragonflies, darning-needles, may-flies, &c.; 4th. Ants, wasps, bees, &c.; 5th. Butterflies and moths or "millers;" 6th. Bugs, treehoppers, plant-lice, &c.; 7th. Flies, gnats, &c. The first four of these Orders are placed in a section called *Mandibuláta*, or chewing insects, as they are provided with strong and powerful jaws or mandibles for cutting and masticating coarse substances. The other three are called *Haustelláta* or sucking-insects because they are furnished with a hollow or tubular proboscis or sucking apparatus in place of jaws. In almost all works on this subject the beetles have been placed at the head of the list and we shall follow this system for convenience, although the discoveries of some modern students seem to point out other Orders as more highly organized, and accordingly better fitted to rank as the first. These theories of naturalists, however, are not of material importance to a paper of this kind where we propose to deal only with established facts.

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* The exceptions to the foregoing rules are the Orders, *Orthóptera*, containing the crickets, locusts, grasshoppers, &c.; *Neuróptera*, or the may-flies, case-flies, devils' darning-needles, &c., and *Hemiptera*, comprising all bugs, plant-lice, and harvest-flies or cicadas (vulgarly called seventeen year "*locusts*," &c.) The insects pertaining to these Orders are equally active and voracious in all their stages, and the line of demarcation between these stages is exceedingly indistinct.

The *Coleóptera*, or Order of Beetles is so called from the Greek work *koleopteros*, signifying a sheathed wing, which was applied to these insects on account of their having a pair of soft membranous wings folding under a hard cover. This cover, with but few unimportant exceptions, is in two parts; hinged at their bases to the *thorax* of the insect and meeting in a straight line down the back. These covers are called the *elytra* and are frequently marked with impressed lines, or punctured, or in some cases covered with fine hairs or scales of various colors in irregular patterns, those on one wing-cover being exactly copied but in a reverse position upon the other so as to produce a symmetrical figure, when the wings are folded and the *elytra* closed.

The first insects we meet with in this Order belong to the family *Cicindelídæ*, so called from the Latin *cicindéla*, signifying a glow-worm, or shining insect. This name was applied to them on account of their brilliant colors and polished metallic lustre reflecting the sun's rays, they are sometimes called "sparklers" from the same circumstance, but more commonly "tiger-beetles" from their habit of leaping on their prey. The favorite haunts of this group are sandy roads, and spots almost bare of vegetation, where they can detect and seize other insects without obstruction to their agile movements. In the sunny days of spring and summer they may be seen in such localities starting from under the feet of the traveller with a swift and noiseless flight only to alight a few feet ahead, facing about to meet the threatened danger as they touch the ground. This operation is often repeated several times before they will take refuge in the grass or other herbage at the sides of the road; in cloudy or stormy weather they are seldom or never seen, but an hour's sunshine will generally attract them in numbers from their hiding-places.

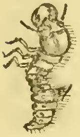
Fig. 5.

Their eggs are deposited in the earth and the larvæ, which are hatched from them are not a little singular both in form and habits. Figure 5 exhibits the larva or grub of a tiger-beetle. They live in cylindrical holes, which they burrow into the earth in a nearly perpendicular direction several inches in depth; stationing themselves at the mouths of these excavations, which are completely filled by their large and horny heads, they remain until some luckless insect approaches when they suddenly seize and convey it to the bottom to devour at leisure; an extraordinary appendage, consisting of two recurved hooks is found on the eighth segment of the larva, which serves as a hold or anchor to prevent their being dragged from the mouth of the cave by the attempts of the victim to escape. These holes, no larger round than a small lead-pencil, may frequently be observed in situations which preclude the idea of their being the work of earth-worms, and having no rubbish or pile of gravel about the opening would not be mistaken for the entrance of an ant hill. If a stalk of grass, or slender, straight twig be thrust down to a sufficient depth the ferocious inhabitant will often seize it with so firm a grip as to be drawn out upon the surface by means of it rather than to let go his hold. On examination he will prove to be, in common parlance, a yellowish, white worm, with six legs, and a horny, brownish head, with sharp jaws. In this condition it exists during the summer, and it is supposed passes through its transformation in the ground during the winter and appears in the beetle-form the following spring, when they may be seen, even before the snow has entirely disappeared, running and flying with astonishing activity; they generally prefer, however, the middle of the day, and the warmest places.

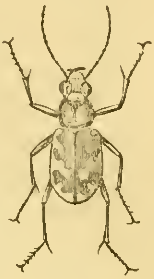

Fig. 6.

Cicindéla generósa of Dejean, or the generosa tiger-beetle, (figure 6,) so called, from its size and beauty (the Latin *generósa* signifying noble, or of the first class,) is the largest of this group found in Massachusetts. The head is of a coppery tint in front and above with a few blue or green shining spots, and a bunch of short white hairs, thinly set and spreading to each side, between the eyes; behind and below the eyes blue; the *labrum* or upper lip is whitish with three black teeth on the front margin; the *mandibles* or jaws black at the tips and white at the base; the *antennæ* are dull blackish, except the four basal joints which are green or shining greenish blue; the *thorax* coppery, with two transverse, impressed lines of a greenish color, the portion between these lines elevated, and almost divided longitudinally into two *lobes;* both head and *thorax* beneath, violet blended with coppery and covered with short whitish hairs; *abdomen* green and hairy; *elytra* dark purple, almost black, a fine line of the same color margining them and becoming green at the tips; three whitish lunules on each *elytron*, as seen in the engraving; feet dark green, coppery above, and somewhat hairy. Length rather below .70; breadth, .20 to .25. It may readily be distinguished from any other Massachusetts species, by its superior size and the greater breadth of its markings.

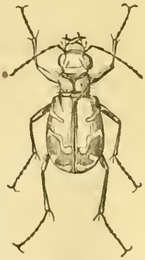

Fig. 7.

Cicindéla vulgáris of Say, or the "common tiger-beetle" (figure 7,) may be found in almost every part of the State; it is somewhat smaller than the preceding, measuring from .52 to .60 in length, and from .20 to .25 in breadth. The colors above are similar to but much duller than those of the preceding, the lunules are more slender, and angular and do not spread into a broad, white margin at the sides like those of the "generosa tiger-beetle." Beneath, the body is not so hairy, and the prevailing color more of a metallic blue, mingled with coppery.

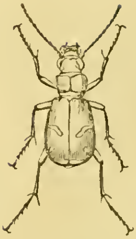

Fig. 8.

Cicindéla purpúrea of Olivier, or the "purple tiger-beetle," (figure 8,) is often found in company with the foregoing, and is one of the most beautiful of our species, the play of its glancing colors when in life and motion cannot fail to be admired by the most prejudiced. The head and *thorax* are coppery, two streaks between the eyes, and the two impressed lines of the thorax green; *elytra* generally of a bright copper color, sometimes, however, clouded with green, a whitish, irregular, abbreviated band behind the middle, and the terminal lunule usually broken so that a small, round dot, and the tip alone remain; feet reddish coppery, and with the green body beneath somewhat hairy. Length a little more than .50; breadth about .23.

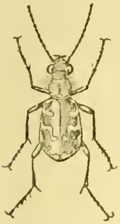

Fig. 9.

Cicindéla hirticóllis of Say, or "hairy necked tiger-beetle" (figure 9,) has but one black tooth on the white *labrum*, but to the superficial observer would appear like a small specimen of the *generosa*, the colors of the head and thorax are brighter than in that species, and thorax as the name implies is thickly clothed with whitish hairs on the sides; the white margin is not continuous, the external points of the middle lunule being separated from those of the others by the ground color of the elytra; it is also much smaller, measuring from .43 to .50 in length and about .22 in breadth.

Cicindéla hemorrhoídalis of Hentz, or "red-tailed tiger-beetle" is found only in the vicinity of the Blue Hills in Milton and the neighboring towns, and is readily distinguishable from our other Massachusetts species by its red abdomen, which when flying "appears like a drop of blood suspended to its tail," (Dr. A. A. Gould.) It measures about .45 in length and from .18 to .20 in breadth.

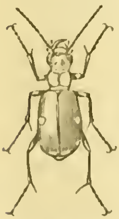

Fig. 10.

Cicindéla sexguttáta of Fabricius, or "six-spotted tiger-beetle," (figure 10,) is of a bright green, occasionally changing to blue after death; it is marked on each *elytron* with a small white spot about the middle of the margin, a smaller one behind this, and the tip white. This species measures from .45 to .50 in length, and rather less than .22 in breadth. I have found it more common in lonely paths through woods, and upon large flat rocks, shaded by thick foliage, where its beautiful green color attracts immediate attention.

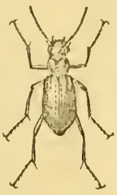

Fig. 11.

Cicindéla punctuláta of Olivier, or the "dotted tiger-beetle," (figure 11,) is the smallest species found in this State. It is of a dark bronze, or even black color, and the usual lunules of this genus are contracted, and often broken into mere specks of white ; the tips are more distinctly margined with a very narrow white line, with a cluster of small blue or green punctures on the base of the *elytra ;* inside of this an irregular row of similar punctures on each side of and almost parallel with the suture. It measures about .43 in length, and but little over .16 in breadth. It is a very common species on sandy roads, and is even found in the streets of cities.

Cicindéla dorsális of Say, or "white-backed tiger-beetle," and *Cicindéla lépida* of Dejean, or the "elegant tiger-beetle," are only found near the coast on the white sand-beach ; the prevailing color of their *elytra* being white, enables them more easily to escape detection. The only place in this State where they have been found, to my knowledge, is the island of Martha's Vineyard.

Cicindéla margináta of Fabricius, or the "margined tiger-beetle," is of an olive color with green reflection, and with a broad whitish margin sending lunules and flecks of white toward the suture. The tips of the *elytra* in the female, instead of being rounded like those of other species, are bent backward and downwards, giving to the extremity something like the outline of the letter W. It is found on the salt-marshes along the eastern coast. Length about .50, breadth less than .25. One or two other species are occasionally found in this State, belonging to this interesting and useful genus, but would hardly be distinguished by the casual observer from some of the above-described.*

The large family called *Carábidæ*—from *cárabus*, a lobster—is commonly known by the name of "ground beetles," and consists almost entirely of insectivorous species, none of the family in this country having been found injurious to agriculture, although in Europe one or two species are accused of so far deviating from the usual course as to cause some damage in cornfields by devouring the grain.* Among the first of our ground beetles in the natural classification stands the

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* Full descriptions, with illustrations of this genus, may be found in the Transactions of the American Philosophical Society for 1857, Vol. XI., containing all the known species of North America, by Dr. John L. Leconte.

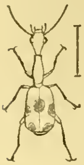

Fig. 12.

Casnónia pensylvánica of Dejean, or "Pennsylvanian Casnonia," (figure 12, magnified,) a slender insect, with a black polished head, broadest between the eyes, and tapering behind to a very narrow neck, *thorax* as long as or longer than the head, narrowest before, rounded and polished black like the head, *abdomen* black beneath, feet and four basal joints of the antennæ yellowish, remainder of the *antennæ* dusky; *elytra* reddish, longitudinally punctured in rows, a black band across the middle, sometimes broken into three spots, and the tips black. Length about .25, breadth about .06.

Galeríta janus of Fabricius, or the "Janus ground-beetle," was named for Janus, an ancient Roman deity; *galeríta* signifies adorned with a head-dress of red leather in the form of a helmet. It is of somewhat similar form to the following, although much larger, measuring .70 in length, and .23 in breadth. The head is black, with a longitudinal red stripe beneath; *antennæ* reddish, except the second, third and fourth joints, which are fuscous; *thorax* and feet reddish; *abdomen* fuscous beneath; *elytra* dark blue, or purple, longitudinally furrowed.

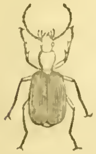

Fig. 13.

Brachínus fúmans of Linnæus, or the "smoking bombardier," (figure 13,) is one of a large genus having the remarkable property when attacked of ejecting from the *anus* a small amount of liquid, or vapor, accompanied by a slight report and a peculiar odor; this substance discolors the fingers while holding the insect, and resembles nitric acid in its effects. This operation may be repeated as many as twenty times before the stock of ammunition appears to be exhausted, and is supposed to be intended as a defence against more powerful beetles. This peculiarity acquired for this genus the common name of

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* See Kollar's Treatise on Insects Injurious to Gardeners, &c., page 87, and Curtis's "Farm Insects," pages 212—214.

"bombardier beetles," and the technical one of *Brachinus*, from the Greek *Bracho*, meaning to rattle or make a noise. The species figured is of a reddish yellow color, on the head, thorax and feet; the eyes black; antennæ dusky; abdomen darker beneath, clothed with short yellow pile; and elytra dull blue. It measures about .40 in length, and not far from .16 in breadth. Like both the preceding species, it is found under stones and boards, in the spring, searching for other insects upon which it preys.

Cymindis pilòsa of Say, or pilose ground-beetle, (*Cymindis* signifies a night-hawk,) with others of the same genus, may be found under the loose bark of trees, and in damp situations, preying upon the small herbivorous insects that frequent such places. The pilose or hairy *Cymindis* is about .40 in length, and .13 in breadth, the neck or thorax shaped much like those of the "bombardiers," flattened above, and in the outline like the letter U, dilated at its anterior corners; the color is dark brown, with a short thick pile, which gives it a glistening or velvety appearance. It is common throughout North America.

The different species of *Lebia*, which may be compared in appearance to a flattened and burnished *Brachinus* or "bombardier," are active in their habits, climbers, being often found on flowers some feet from the ground, and in general of a burnished metallic lustre.

Lebia grandis of Hentz, or the large Lebia, is about .40 in length, and .18 in breadth, and is the largest species found in this country. It is of a reddish yellow throughout, with the exception of the elytra, which are a dark steel blue, and the abdomen, which is dark brown. In most of this genus, as in *Cymindis*, the abdomen projects slightly beyond the tips of the elytra, which are very squarely cut. We have in this State some eight or ten species of this genus, some of which are very beautifully marked with stripes, or spots upon the elytra; they are all of service to the agriculturist, feeding upon the smaller caterpillars, *Aphides*, &c., which frequent various plants. Their larvæ are supposed to live in the earth and to prey upon injurious insects.

Calleída punctáta of Leconte, or the punctured Calleida, (the latter name signifying beautiful form,) is found less commonly in this State. It is of a more slender shape than the *Lebiæ*, the head and abdomen greenish black; feet, thorax, and four basal joints of the antennæ honey yellow; the rest of the antennæ, with the tarsi and knees, black; and the elytra of a brilliant green. It is about .30 in length, and .09 in breadth.

Scarítes subterráneus of Fabricius, or the subterranean Scarites, (the latter name was used by the Greeks to denote a precious stone known only to the ancients,) is readily distinguished by its peculiar form, the thorax being connected to the abdomen by a long cylindrical joint. It is of a deep black, with the exception of the tarsi and antennæ these are brown, and somewhat hairy; the fore-feet are stout and strongly toothed, fitting the insect for its mode of life, as it derives its name from its habit of burrowing in the earth to feed upon other insects; the head is quite large, the mandibles deeply carved; the front is marked with two large indentations, and the thorax is rounded at the hinder angles and acutely pointed at the anterior, with an impressed line around the margin, and a longitudinal one in the middle. Length from tip of mandibles .75, breadth about .22.

Pasímachus depressus of Fabricius, a much larger insect of somewhat similar appearance, is more rarely found here, but is quite common in the middle and southern States; its habits are much the same as those of the preceding.

The genus *Clivina* of Latreille is well represented in this State by various species, none of them measuring over half an inch in length, and the majority of them much less; they are of a plain brown or polished black, and may be known by their resemblance to the subterranean Scarites in the form of the thorax and abdomen, which are more distant than in the following.

Scaphinótus elevátus of Fabricius is so named from two Greek words signifying boat-backed, in allusion to its outline; *elevátus* meaning raised, is applicable to the swelling of the back along the suture, or to the elevated margins of the thorax and elytra. It is occasionally seen in the vicinity of woods, its bright purple elytra readily catching the eye; it has a long, narrow, black head, with prominent eyes; a black thorax, with the lateral margins curving upward, so as to give it a very concave appearance, and the hinder corners deeply overlapping the elytra; the latter are turned up at the anterior margins, and black except on the swelling, upper surface, where they are of a reddish purple, with longitudinal impressed lines. It measures about .80 in length and .35 in breadth.

Cárabus serrátus of Say, or the serrated ground beetle, (figure 14,) is of a polished black color, with violet margins, and three longitudinal rows of embossed oval tubercles on each elytron. The head and jaws are not so much elongated as in the preceding, but the eyes are equally prominent; the elytra are turned up at their margins, the inner side of which are of a violet blue. It is a very common insect in Massachusetts, and measures .75 in length by .35 in breadth.

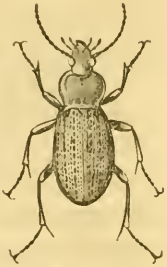

Fig. 14.

The greatest enemy of the canker-worm, in some parts of the State, is a beautiful, green, shining beetle, called by Fabricius, *Calosóma scrutátor*, or the searcher; it has received in some places the name of "caterpillar-hunter." *Calosóma* from the Greek signifies handsome body. Figure 15, (*Harr.*,*) represents this species; the head and thorax are dark blue, almost black; the former with two longitudinal streaks between the eyes, of a brassy green color, and the latter broadly margined with the same; the elytra are bright green, finely lined and punctured, and with a broad, coppery margin; beneath, bright green, varied with coppery; feet blackish, except the femora, which are of a steel-blue color, inclining to purple. It measures in length from 1, to 1.15, and about .55 in breadth.

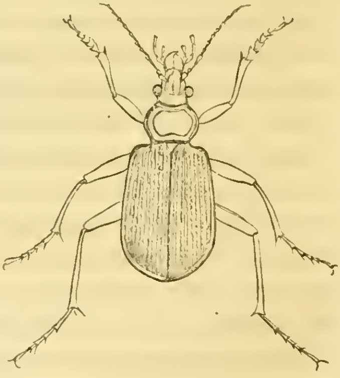

Fig. 15

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* This cut, and others which follow, marked "*Harr.*," were kindly loaned by the editor of the new illustrated edition of Dr. T. W. Harris's "Treatise on some of the Insects Injurious to Vegetation," published by Crosby & Nichols, 117 Washington Street, Boston. This work is of great value to the farmer, being the only one yet published in this country which treats of our native noxious species, in such a lucid style as to bring the subject within the comprehension of every one.

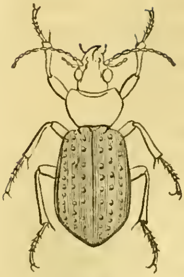

Fig. 16.

Calosóma cálidum, the hot, or glowing calosóma, (figure 16,) was so named by Fabricius, probably on account of the appearance of the elytra which seem like the perforated cover of a glowing furnace, being punctured with six longitudinal rows of sunken metallic spots of a brilliant red. This insect is much more common in the eastern part of Massachusetts than the last described, and is of a smooth shining black, with a large head and powerful jaws; a short and broad thorax somewhat turned up at the margin; and elytra finely lined, and punctured as described above. It measures over .90 in length, and .45 in breadth.

The genera *Eláphrus* of Fabricius, meaning light or nimble, and *Notióphilus** of Dumeril, meaning moisture-loving, are of much smaller size than the last group, averaging from .20 to .35 in length. The first is represented in this State by one not uncommon species, the *Eláphrus ruscárius* of Say, a name taken from the *Ruscus aculeatus* of Linnæus, or "butcher's broom." This insect is of a dark brownish green, a little bronzed, about twenty large, round, impressed purple spots on each elytron, and three raised tubercles of a squarer form on each side of the suture; the eyes are quite prominent and the appearance of the insect is much like that of a small and thick tiger-beetle, but the elytra are much broader at their base than the thorax. It measures over .3 in length, according to Say, a specimen in the State Cabinet, however, is scarcely .26 in length, and .12 in breadth. The *Notióphili* are smaller and more slender than the *Elaphri*, and of a polished brown or black with bronze lustre. They, like the preceding, are found on the muddy banks of streams, and other damp localities, and are exceedingly active in their motions.

Chlænius of Bonelli, (*Chlaina* in Greek signifies a woollen cloak,) is represented here by seven or eight species, of which *Chlænius seríceus* of Forster, or the "silky ground-beetle" is the handsomest and most common. The head and body beneath are black, the feet and antennæ light brown or yellowish; the head and thorax, above, shining green with very fine punctures, the latter has a short longitudinal impressed line in the middle, and a deep indentation on each side, next to the elytra; these are green covered with a cloak of short yellow hairs, visible under a magnifier, which give the insect a silky lustre and its name. It measures from .55 to .70 in length, and about .25 in breadth. The genus *Dicœlus* of Bonelli, from *dis* and *coilos* meaning two hollows, is readily distinguished from most others by its peculiar form and markings. The head is large with two deep hollows or indentations on the front, the thorax as broad as the elytra, broadly turned up on its lateral margins, and deeply lined and indented, the elytra deeply furrowed, and somewhat turned up at the outer corners in front. Our more common species are polished black, but some southern and western ones have a beautiful lustre of purple or violet. *Cálathus* of Bonelli, (meaning in the Greek a wicker-basket,) and its allied genera are among the most common and useful ground-beetles throughout the country. The genus *Anchómenus* of Bonelli contains several species of which *A. extensicóllis* of Say, is perhaps the most common here; the legs are yellow, the head or thorax green, and the elytra bronzed green or slightly purple. It measures about .4 and resembles closely in form *Agónum cupripénne* of Say, or the "copper-winged Agonum," (figure 17, a, shows the natural size,) a slightly broader insect of most brilliant colors, the head and thorax polished green, elytra purplish red with green margin, and black legs. This species is very common under stones, especially in the western part of the State. There are other species of this genus found here, but none so brilliant in their colors and markings. By far the greater number of the ground-beetles of small size that are observed, however, on turning over a stone or log in any part of the country, belong to the genus *Pteróstichus* of Bonelli. These swift, shining black, "hard-shelled" beetles, some of them with brilliant metallic reflections, are almost universal, and exceed in the number of species any other group in this country. They are so similar in general appearance that the superficial observer would hardly be able to identify the species.

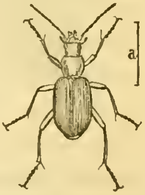

Fig. 17.

Amára of Bonelli (a drain or stream, Greek,) comprises those smaller species of a dark *æneous* or bronze color, of a more regular elliptical outline from head to tip, and are numerous in the same localities as the preceding. They are of insectivorous habits, so far as observed in this country, and probably throughout the world, although in Europe some species are said to have been found attacking grain. However this may be, the slight damage they can possibly do by destroying a few kernels of grain, is hardly appreciable in view of the numerous larvæ of other insects which they devour. Two species of the genus *Agonoderus* of Dejean are found commonly in Massachusetts. These are *A. pallipes*, Fabricius, and *A. lineola* of the same author. The former is, on the upper surface, of a light brown throughout, with black head and two long black stripes on the elytra; the abdomen below is black, but the legs and antennæ are yellow or light brown. It measures about a quarter of an inch in length, and is found in similar localities and living on the same kind of food as the preceding. *Pangus caliginosus* of Fabricius, the foggy or smoky Pangus, (figure 18,) is the only species of this genus that I have found in Massachusetts, and is extremely common especially in ploughed ground where it is continually devouring the various cut-worms and soft-bodied, naked caterpillars that feed on the roots of grain crops; it is one of the largest of our useful ground-beetles and is of a polished or smoky black, with the exception of the tarsi, antennæ and palpi which are of a light brown or reddish hue. It measures very nearly an inch in length. The thorax fits very squarely the front of the elytra and is much rounded and bulging across the middle, the elytra deeply cut in longitudinal parallel lines, of which the one nearest the suture or seam, on each side, forks into two short branches as it approaches the thorax. The legs are black and strong, the anterior pair being the shortest. The genus *Harpalus* of Latreille comprises a large number of species common in the New England States, which may be easily distinguished by the common eye from their close resemblance to the preceding genus, being apparently built on the same model but reduced in size. They are all extremely voracious and dispose of a great number of noxious insects in a season.

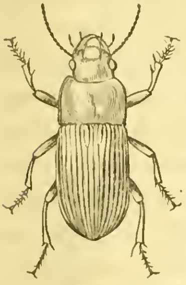

Fig. 18.

The genera *Trechus* of Clairville, *Bembidium* of Illiger, and *Ochthedromus* of Leconte, are commonly represented here by quite small species, many of them marked with light or metallic spots; some of them feed upon dead animal matter as well as upon other insects, and although scarcely averaging .1 in length, have been known to attack and destroy an insect of five or six times their bulk.

In the natural classification of insects, so far as modern investigations have been able to prove, we next come to a large group living almost entirely in or upon the water, some preferring the muddy bottoms of half stagnant ponds, others the surface of clear, running streams. This group is divided into two families, the *Dytíscidæ*, and the *Gyrínidæ* of Linnæus. The former, derived from the Greek *dytes*, signifying a *diver*, and the latter from *gyros*, signifying a circle, in allusion to the peculiar habits of this family in gliding round and round on the surface. They are all insectivorous, both in the larva and imago state, but as they feed chiefly on the insects inhabiting the water which are either similar in their food and habits to their destroyers, or devour only water plants of no value to the agriculturist, they can hardly be considered as among the most serviceable of the insect tribes. They frequently seize, however, on noxious insects which fall into the water by accident, and would otherwise escape. The *Gyrínidæ*, commonly called "whirligig-beetles," are seen during the summer months circling round, and darting swiftly in various directions on the surface of almost every pool or rivulet. They are all of a broad, oval form, generally of a polished black, with broad, oar-like hind tarsi and long slender fore-feet, used in seizing their prey, and have a singular smell, somewhat like that of over-ripe apples when taken in the fingers, which proceeds from a milky fluid secreted by them. They are of various sizes, measuring from less than .2 of an inch to considerably over half an inch in length. They occasionally migrate from one pool to another, generally flying during the night, when they may often be attracted by a light; they are frequently picked from the glass tops of green-houses or hot beds, on which, mistaking the surface for water, they have dropped with such force as to stun or kill them. Figure 19 represents one of our commonest

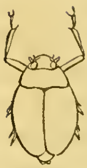

Fig. 19.

species, the *Gyrínus boreális* of Aubé, or northern whirligig-beetle. Several large groups of beetles, such as the *Sílphidæ* of Linnæus, from *silpha*, signifying a stinking insect, and the *Nitidulídæ* of Fabricius, feed entirely upon carrion or decaying substances of various kinds, and *fungi*, and can only be considered beneficial by removing these fruitful sources of disease from the earth. The succeeding families of the coleoptera may be ranked as either neutral as regards agriculture, or extremely noxious and destructive. Among these are the "borers," and the curculio families or weevils,—the May and rose-beetles,—the "wire worms" or larvæ of the snapping beetles. These groups are very large, and exercise a great influence on the vegetable productions of the earth. The *Lampýridæ* of Linnæus, from the Greek *lampyris*, signifying a glow-worm, contains the "fire-flies" and other beetles with soft elytra, many of which feed upon slugs and snails, and others upon various insects. The *Malachíidæ* of Fabricius, from the Greek *málacos*, signifying soft and appropriate to the texture of the bodies and elytra of this family, and the *Cleridæ* of Geoffroy, (from *cleros*, an insect found in bee-hives,) are also beneficial to the farmer by devouring other insects. The *Chrysomélidæ* of Linnæus, (from a Greek word meaning *golden apple*, which was suggested by the plump, rounded forms, and brilliant metallic colors of some of the species,) on the other hand, are vegetable eaters, and from their number and great fecundity are among the most destructive to cultivated plants; among these we find the potato-beetle, *Lema trilineáta* of Olivier; the striped cucumber beetle, *Diabrótica vittáta* of Fabricius; and the various "flea-beetles," the most prominent of which are accurately figured and described in the new illustrated edition of Dr. Harris's work.

The *Coccinéllidæ* of Linnæus, (from *coccos*, scarlet, in allusion to the prevailing color of the elytra,) are sometimes called "lady-birds" or "lady-cows," and are well known to horticulturists as the destroyers of the *Aphis* or plant-louse, which composes their chief food, especially during the larva state.

Coccinélla novemnotáta of Herbst, the nine-spotted lady-bird, is one of our commonest species, and has proved itself one of the most useful, during the recent raid of the grain-

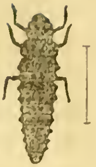
Fig. 20.

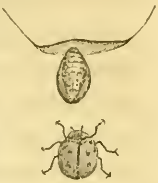
Fig. 21.

aphis. Figure 20, (*Harr.*) represents the larva somewhat magnified; the perpendicular line at its right exhibits the natural length; it is of a bluish black, spotted with orange; after arriving at its full size in this stage it glues its anal apex to the under-side of a leaf or other suitable object, and with its head hanging downward, shakes off its skin and appears as represented in the upper part of figure 21, *Harr.*, the pupa suspended from a leaf; in the course of a few days the pupa-skin splits open and the imago, shown in the lower part of the same figure, escapes. This, like the majority of the family to which it belongs, is of hemispherical or half-globe shape, about the size of half a pea; its head is whitish above, thorax white before, with a black band across it behind, sometimes sending from its middle two black tooth-like spots, toward the head; the elytra are dull orange, with a narrow dark suture halving a rhomboidal or diamond-shaped black spot just behind the thorax; on each elytron four black spots, the two nearest the anterior margin being the smallest, and the one nearest the apex usually the largest; feet and body beneath black, except two or three small whitish spots on each side of the thorax. It measures .25 or less in length, and about .20 in breadth.

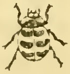
Fig. 22.

Coccinélla trifasciáta of Linnæus, or three-banded lady-bird, (figure 22,) is marked upon the thorax much like the last, but the head is black with two white spots on the vertex; in many specimens these white spots unite in one, and form a transverse band between the eyes; the elytra are rather lighter in color than in the nine-spotted lady-bird, and each crossed by three black bands; the ones immediately behind the thorax meet at the suture, the others are shorter, but none of them reach the outer edge of the elytron; the body beneath is black, with one or two small white spots on each side of the thorax; the feet also black, and the length is scarcely .20, breadth .15.

Coccinélla bipunctáta of Linnæus, or two-spotted lady-bird, is very numerous in the city of Boston and vicinity, where the shade trees furnish a large supply of its favorite food, the plant-lice. Its head is whitish, eyes black, and between them a black mark of an hour-glass shape, or contracted in the middle, reaching from the front to the thorax, which is whitish with a black mark occupying the middle, in the shape of a reversed W ; the elytra are red, each with a rounded black spot in the centre ; the feet and body beneath black. It varies considerably in size, one specimen in the State Cabinet measuring .22 in length and .15 in breadth, and another only .15 in length, by .11 in breadth. These insects bend their feet and head beneath the body when wounded, although they will generally allow themselves to be taken in the hand without exhibiting alarm, and will even seize and devour an Aphis, if offered to them ; many of them secrete a yellowish gummy fluid, resembling somewhat in taste and smell the juice of the *Chelidonium majus* or celandine, and were formerly prescribed by the ignorant as a cure for toothache.

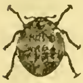
Fig. 23.

We have in this State twenty or more species of this interesting and useful family, only one of which, the *Epilachna boreális* of Thunberg, or northern lady-bird, (figure 23,) is accused of being injurious to agriculture. The larvæ are sometimes found on the leaves of the pumpkin and squash, and are supposed to feed upon the soft internal substance called the *parenchyma*. I am informed by a gentleman of considerable eminence in the study of Entomology, that he took numbers of the imagines from the interior of a partially decayed squash, where they were apparently feeding upon the pulp. They are not sufficiently abundant, however, to create apprehension, the only locality in this State where they have been noticed, so far as I am aware, being the town of Barnstable and vicinity.

The insect is horn-colored above, with four small black spots on the thorax, and seven much larger ones on each elytron, the first six arranged in two rows across, and the seventh larger and more rounded than the others ; the body beneath is of similar color to the upper surface, with a few faint sutural black bands on the venter, and a large spot on each side of the thorax between the second and third pair of feet. It measures over .30 in length, and nearly .25 in breadth.

The *Canthúridæ*, from *cantharis*, a beetle hurtful to grain, or as they are now called, *Melóidæ*, from the typical genus *Meloe*, of Linnæus, are celebrated for their blistering properties and other uses in medicine, but all belong to the class of vegetable-feeders, two or three species in this State attacking the potato vines and other plants, and often doing considerable damage; these are possessed of the same qualities, in a greater or less degree, and may be collected and made as serviceable, as the imported blistering-beetle, or "Spanish fly."

Most of the remaining families of *Coleoptera* are either injurious to vegetation, or neutral as regards agriculture, some feeding exclusively on fungous plants or decaying wood, and others upon putrifying animal matter, like many of the short-winged *Staphylínidæ*, or rove-beetles; some of these, however, have been known to attack and destroy other insects, and should be in general regarded as belonging to the beneficial class, as they aid in removing offensive substances from the surface of the earth, and in assimilating them with the soil, which tends to enrich and fertilize it. These species may be recognized by their short elytra, which usually do not cover half the abdomen, and their strong, sharp mandibles, as well as by the active motions and the habit of curving the abdomen upward and forward toward the head; from this peculiarity they are in some parts called "devil's coach-horses," and "cock-tails."

The second Order of the modern system of classification, ORTHÓPTERA, or insects with straight, nearly parallel wing covers, legs fitted, for the most part, for leaping, and comprising the true locusts, grasshoppers, crickets, &c., are represented in New England only by those species injurious to vegetation or other property of the agriculturist and will not require extended mention in this place.

The third Order, NEURÓPTERA, or nerve-winged insects, consists almost entirely of insectivorous species and is specially to be regarded as friendly to the farmer. The "dragonflies" or "devil's-needles" are to be seen during the whole summer, swiftly darting and circling through the air, seizing and devouring the moths and butterflies that cross their path. In passing a pool or brook the sharp rattle of their thin, crisp wings strikes the ear and calls the attention to the sportive flight of these terrible destroyers. Moths and butterflies laden with eggs, that venture from the security of the foliage to wing their sluggish flight to some appropriate place to deposit their burden, are quickly snapped up by the watchful dragonfly, who tears off the lean and useless wings, and makes a rich repast on the plump body of his victim. It would be perhaps considered unnecessary to advert here to the childish tradition of the terrific effects of the dragonfly on the human system, namely: its alleged powers of sewing up the eyes, and of stinging men and animals, were it not that an immense amount of ignorance yet exists concerning some of the most common objects of nature. With regard to the useful and graceful creatures of this group we should rather consider them as benefactors, knowing that they are incapable of injuring ourselves or our domestic animals, and that the powerful mandibles, and sharp claws with which they are armed, are only terrible to our enemies, the moths and butterflies. These, we have been taught in our early years to admire and protect: strong admonitions to abstain from injuring or destroying the "beautiful butterfly" are impressed on the minds of children; but science has proved that the beautiful butterfly is the parent of the noxious and repulsive "worm" or caterpillar, and capable of producing some thousands of these at a birth. It may be here stated as a well ascertained and authenticated fact that there is not one of our native moths or butterflies but what is more or less *injurious* to the agriculturist. The thousands of species known to science subsist on vegetable food with scarce a dozen exceptions, and these destroy furs, woollen clothing and other household property, consume the wax in our bee-hives, or the grease and lard of the kitchen; the *silk-worm moth*, to which we are indebted for so many articles of dress and adornment, is not only a foreign species but also a vegetable feeder like the majority, and the only one from which we receive any direct benefits.

To return to the dragonflies, however, their eggs, which are laid near the surface, beneath the water, hatch, not into winged insects like the parent, but into oddly-shaped animals, which are chiefly remarkable for their *masked* mouth, and the power of moving by means of a jet of water expelled from the tail. They pass most of their lives during the larva stage in crawling about upon the bottom and feeding upon other aquatic insects or even small fish; after some months they become full grown, having changed their skin many times, and now are in the pupa state appearing with short wing-cases ; now emerging from the water they cling firmly to some stone or other substance a few inches above the surface, and the skin on the back splitting open, the insect slowly disengages itself and works its way out, having now wings and other organs like its parent ; these at first are moist and crumpled, but in a few hours become expanded and hardened and the brilliant colors gradually become apparent. Figure 24 represents the pupa form of a common species. The larva can in its earlier stages be distinguished from this by the absence of the four wing-cases shown in this figure, of a long, triangular form, just behind the bases of the posterior feet. The first section of this Order, called *Pseúdoneuróptera* or false Neuróptera, contains, beside the dragonflies and darning-needles, several families. The white ants, as they are called, belong to the *Termitína* ; and the small whitish " mites " or " lice," as they are improperly named, which are found in old books, belong to the family *Psocína*, from a Greek word meaning dusty. The genus *Psócus*, of Latreille, also belonging to this family is composed of small species of soft texture, which are supposed to feed upon the minute insects, and other almost microscopic animals that live in the crevices of bark, and in moist, mossy patches on trees.

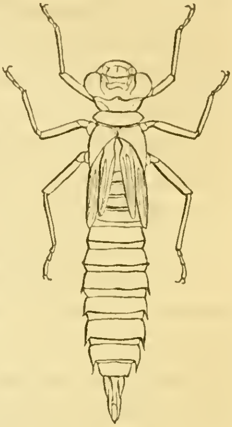

Fig. 24.

The most common of our New England species is the *Psócus venósus*, of Burmeister, or veined Psocus. They are found in great numbers on various trees in the spring and summer months, more frequently perhaps on the apple and cherry, and are apparently gregarious, crowding so closely together as to completely cover the bark for a space of the size of a man's hand, but when approached by the finger or a stick, will scatter in all directions. The wingless ones or pupæ, which bear a slight resemblance to ants, being very active.

The antennæ are nearly half an inch in length and slender, consisting of two pale basal joints, and several long, black, and lightly hairy ones ; the head brassy ; thorax margined with yellow ; the feet whitish ; abdomen fuscous, (brown or dark-colored,) banded with yellowish, and of a plump, rounded form in the wingless specimens; the anterior pair of wings are of a dark, smoky tint, veined near the base with yellow; the posterior pair, of a lighter shade, almost hyaline, (clear, transparent, like glass.) The winged or adult specimens scarcely average .4 of an inch to the tips of the wings, which expand from .6 to .8.

The families *Perlína* and *Ephémerína*, or may-flies and day-flies, as they are commonly called, if not strictly of service to the agriculturist, are at least perfectly innoxious, passing their preparatory stages in the water and subsisting chiefly on aquatic insects. After acquiring wings they furnish food for various kinds of fish, and are frequently used as a bait by the angler. In some parts of Europe they are said to occur in such immense numbers as to be collected for manure. Although we have several species in New England, they are not of sufficient influence or prominence to require mention here.

The family *Odonáta* comprises all the day-flying insects commonly called "devil's darning-needles," "dragonflies," or "horse-stingers," and "mosquito hawks." These are again divided into tribes, sub-families, and genera; the first tribe *Agrionína* of Fabricius, (from a Greek word meaning wild or savage,) is very largely represented in Massachusetts; it contains the more slender-bodied insects known as "darning-needles," and distinguished by their short, broad heads with distant eyes, and four-jointed short antennæ, which appear like two tapering bristles situated between the eyes.

The genus *Calópteryx* of Leach, from *kalos*, beautiful, and *pteryx*, a wing, is appropriately named and contains some of our handsomest species. The body is generally of a shining brassy green, or bluish color, and the wings broadest toward the apex and finely veined. The females of this genus have an oval, whitish spot on the anterior margin of each wing near the tip, which is called the *ptérostígma* or wing-mark; this is found throughout the *Odonáta*, and is of great value in identification, being of various forms and colors in different species, and not generally confined to one sex as in the present case.

Calópteryx apicális, of Burmeister, or the black tipped darning-needle, is about one inch and seven-eighths in length; expanse of wing two inches and a half; head and body blackish beneath; elsewhere brassy-green, or in some lights, blue; feet black, with rows of long black hairs beneath; wings hyaline with a faint yellowish tinge, fuscous at the tips. Several other species of this beautiful genus are found in this State, some of which have the whole wing of a light smoky color, and others almost entirely hyaline. They fly more slowly than the larger dragonflies, and frequent the banks of running brooks. Another genus, *Hetærína* of Hagen, with narrower wings, the bases of which in the male are sanguineous or reddish is represented here by one described species only: the *Hetærína americána* of Fabricius, or *basális* of Say, who gave it the latter and more appropriate name on account of the basal red marking, not being aware that it had already received the name of *americána* from Fabricius. The male and female of the American darning-needle vary considerably, the former having a general fuscous coppery tint, with three yellow stripes on the sides of the thorax and the base of all the wings bright blood-red, while the female is of a brassy green color above, with four yellow stripes on the thorax and the base of the wings somewhat yellowish, the remainder of the wing in both sexes is hyaline faintly tinged with yellow, especially on the outer margin, and the pterostigma is very small, oblong and yellow, the black nervures or veins which immediately surround it, appearing thicker and more distinct than the others; the feet are whitish beneath, and black above. It is over one and a half inches in length, expanding from two and a quarter inches to more than two and a half. The species belonging to the typical genus *Agrion*, of Fabricius, are very numerous about ponds and rivers, fluttering over the surface in pursuit of their prey, or sporting with their mates whose bodies they seize with their long slender feet, without either's checking their flight, and a pair are often seen attached in this manner gliding in their sinuous flight, a few inches above the surface of the water. The bodies of many are banded and marked with a pearly blue, others partake of the coppery and brassy lustre of the last named species, and others still are of a yellow or reddish tint. *Agrion saúcium* of Burmeister, or the wounded darning-needle, (figure 25,) is of a blood red color upon the thorax and sides of the abdomen; head blackish,

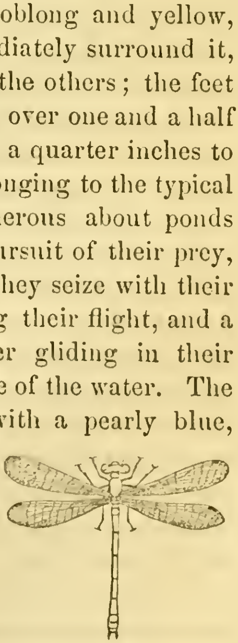

Fig. 25.

dorsum or upper part of the thorax black in the male, red in the female; abdomen red to the seventh segment or joint, whose sides are black, with the remaining segments of the same color; feet pale yellow, wings hyaline, expanding about an inch and a quarter; pterostigma rhomboidal, fuscous, length, one inch or less. This is one of our smallest species. The tribe *Aeschnína*, derived from a Greek word meaning hideous, comprises the largest and most formidable of our dragonflies or large-bodied neuroptera whose eyes are less distant, some appearing as if soldered together above, for a short space, wings unequal, the hinder pair being generally broadest near the base, and having an opaque spot, called *membránule*, on the inner basal angle, behind the joints of the wings which varies in color and size in different species. The abdomen in this family is cylindrical and sometimes longitudinally carinated, (having a slight ridge like the keel of a boat.) Of the genus *Anax* of Leach, meaning a prince or king, we have only one species. *Anax június*, Drury. The Junius dragonfly is of a fine pea-green color, spotted with blue and fuscous, head yellow with a black spot and circular blue band above; thorax green; feet black, femora somewhat reddish; abdomen long, nearly cylindrical, much inflated at base. The first segment or joint and base of the second, green, the remainder blue with a longitudinal fuscous stripe, sometimes broken, wings hyaline, slightly clouded with yellowish in some specimens, pterostigma yellow, membranule black for two-thirds of its length, the rest, toward the head, white. Length, three inches, wings expand over four inches.

The typical genus *Aéschna* of Fabricius, comprises many of our New England species, the largest of which is *Aéschna héros* of Fabricius, or the hero dragonfly. It is not uncommon throughout North America, and may be readily distinguished by its great size, being over three inches and a half in length, from the front of the head to the tip of the anal appendages, while the wings expand about five inches. It is often seen alone at some distance from the water, and is exceedingly active in its motions, soaring and circling like a hawk, whence this and some other species have in various parts of the country received the name of "mosquito hawks." Its size and swiftness enable it to capture and destroy the largest butterflies and moths, and it is to be reckoned one of the most beneficial of its useful Order. It is described in Dr. Hagen's Synopsis,[*] as follows: "Fuscous, marked with yellowish green; front obscure, luteous, (yellowish,) above fuscous, each side with a yellowish green spot; occiput (hinder part of the head) of the female bifid, (split in two parts;) thorax fuscous, dorsum (back,) each side with a stripe, which is angulated at the wings, and at the sides with two oblique stripes, green; feet black, base of the femora subrufous; abdomen long, stout, hardly broader at base, fuscous; the base, middle and apex of the segments, with a subinterrupted, narrow green fascia; (band,) appendages black, subarcuated, (*sub*, somewhat; *arcuated*, curved like a bow,) the base narrower, a tubercle beneath, the apex carinated truncated, (abruptly cut off,) inner edge villose; (covered with fine soft hairs;) inferior appendage one-half the length of the superior, narrow, almost equal, the apex obtusely truncated, sometimes almost bifid; appendages of the female broad, ovate, (of the form of an egg,) foliaceous, (leaf-like;) wings hyaline subflavescent (somewhat yellowish,) in the middle, the apex sometimes infuscated, (darkened,) pterostigma long, narrow, fulvous, (tawny;) membranule white."

Æschna clepsýdra, or the hour-glass dragonfly: *Æ. constrícta*, the narrowed dragonfly, and *Æ. janáta*, of Say, the yellow dragonfly, are all quite common in Massachusetts, and of similar habits to the preceding, although of smaller size.

Libéllula pulchélla of Drury, or the beautiful dragonfly, (figure 26, *Harr.*,) is one of the most interesting of our Massachusetts species, and is often seen during the summer, displaying its beautifully variegated wings as it sails to and fro over the surface of the water. I have frequently seen it basking on rocks by the side of roads, at some distance from the pond or brook where it passed its larva existence. The general color of the body is reddish fuscous, the sides of the thorax with two oblique yellow streaks, the abdomen often with a yellow stripe on each side, or covered with a bluish white coating of powdery scales; the feet are black, with the base of the femora reddish in the female; the wings are hyaline, with three spots of a fuscous or dark smoky color on each, one at the base, one in

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[*] "Synopsis of the Neuroptera of North America, with a list of South American species. Prepared for the Smithsonian Institution. by Hermann Hagen." This work, which was translated from the original by P. R. Uhler, Esq., of Baltimore, is of the greatest value, and supplies a want long felt by the student of this branch. I copy one or two descriptions in this essay as samples of the minute and elaborate accuracy of this work.

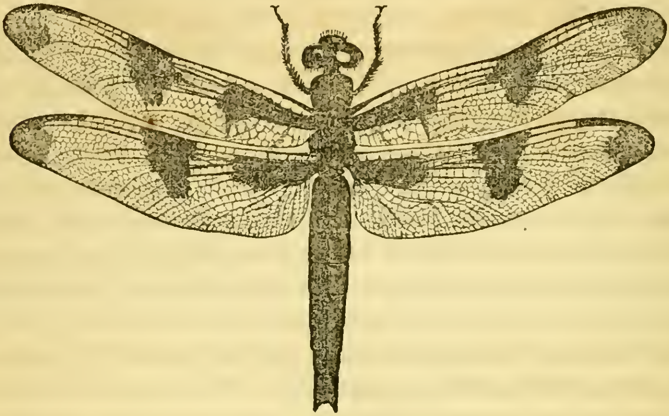

Fig. 26.

the middle, and one at the apex, alternated with two milk white spots on each fore-wing, and three on each hind-wing. It is about 2. in length, and the wings expand 3.50 or more.

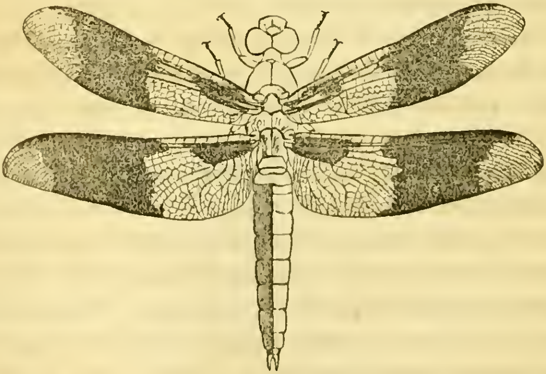

Fig. 27.

Figure 27 is the male, and figure 28, (*Harr.*,) the female, of one of our most common species, known as *Libéllula* (*Plathémis*) *trimaculáta* of De Geer, or the three-spotted dragonfly. This name, however, is appropriate only to the female, as will be seen from the engraving, the male having only two spots on each wing, where the female has three. The upper side of the abdomen in the male appears covered with a bluish white powder, while that of the female is reddish, marked on the sides with oblique yellow spots. The feet of both sexes are black, a little reddish toward the base, and the wings hyaline, excepting the spots, which are fuscous. The hind wings of the male have also a milky spot at the base, covering about two meshes in width, and reaching the hinder angle of the basal fuscous spot.

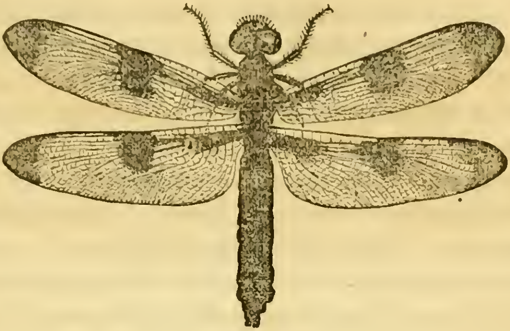

Fig. 28.

Figure 29 represents the female of a common species throughout the country, called *Díplax Berénice*, or the Berenice dragonfly, so named by Drury. The male (figure 30) differs from the female chiefly in the darker color of the abdomen, and in having the wings without the fuscous cloud. The front of the head is bright steel blue with yellow spots, the blue space much larger in the male; the thorax and abdomen black, with many large and distinct yellow bands and spots in the female, and with only five large yellow spots on each side of the abdomen in the male, and one or two on the sides of the thorax. Length a little more than 1.25; wings expand nearly or quite 2.

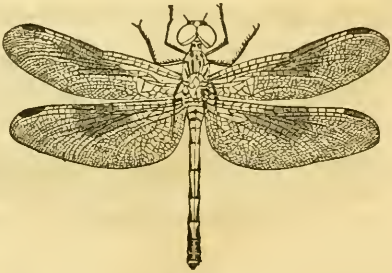

Fig. 29.

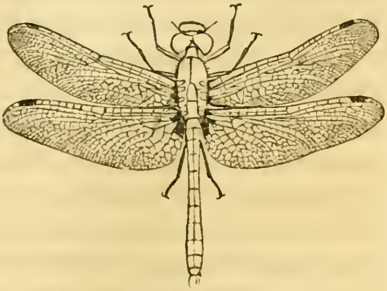

Fig. 30.

Díplax semi cíncta of Say, or the half-girdled dragonfly, is another common species in Massachusetts. It is found in various localities, chiefly however in open places surrounded by woods. It is nearly the size of the preceding, but is of a reddish color, front of the head yellowish red with a broader black stripe before the eyes; sides of the thorax marked with two yellowish spots, partly margined with black; the abdomen shorter than that of any other species of this genus yet found in Massachusetts, and sometimes quite red, so as to attract particular attention when on the wing, or reddish yellow in some specimens. The wings are hyaline, or transparent, excepting near the body, where about half of each hind wing is reddish yellow, and about one-third of the anterior pair of a lighter shade of yellow. The body is less than an inch and a quarter in length, and the wings expand about 1.75.

Díplax rubicúndula of Say, or the light reddish dragonfly, is another extremely common species, of a lighter color than the preceding, with only the extreme base of the wings yellowish, the rest being perfectly clear or hyaline; the feet are black. The wings expand over 2.10, and the abdomen is about 1.30 in length.

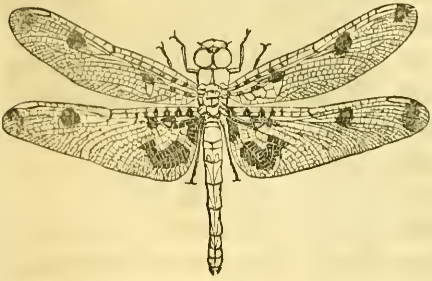
Fig. 31.

Diplax elisa of Hagen, the Elisa dragonfly, (figure 31,) is a less common but very prettily marked species. The head is yellowish in front, the thorax and abdomen black, the former with large greenish yellow spots on the sides, almost covering them, and extending back upon the abdomen for one or two segments. The latter appears black when looked at from above, with a row of six or seven greenish yellow triangular spots. The wings are hyaline, with the front margins near the shoulders somewhat yellowish, or even spotted with fuscous on some of the straight veins. Each of the fore-wings with three small fuscous spots, one at the tip, one near the base, and one about midway between them; each of the hind-wings having the two outer spots arranged in a similar manner, and the base with a very large indented fuscous spot crossed by yellow veins, and separated through the middle by a broad irregular yellow band. The feet are black. The figure represents the insect of the natural size.

Among the insects composing the second division of this Order, or as they may be called, the *true Neuroptera*, we find some which instead of flying by day, and resting during the night, seem to prowl abroad only when darkness shrouds the earth and myriads of insect depredators venture forth to devour the foliage, moist with the evening dew, or to deposit their eggs unseen by human eye. Many of these fall victims to the appetites of night birds, like the whippoorwills, and owls, others are devoured by toads, snakes, skunks, moles and bats, but the night-flying Neuroptera figure largely in the work of destruction. One of the most common of the larger species in this latitude is the *Chauliódes pectinicórnis* of Linnæus, or comb-horned Chauliodes, so called on account of the beautiful manner in which the antennæ or horns are furnished with teeth like a comb. The first or generic name is derived from the Greek word *chauliodon*, signifying with projecting teeth. It is of a greyish brown color, marked with streaks and spots of yellowish, particularly on the head and thorax. The eyes are small, black, and prominent, and nearly in a line between them, upon the head, will be seen three shining points arranged in a triangular form, ˙.˙ ; these are called the *ocelli*, or small eyes, and are supposed to be organs of vision ; in front of these are the antennæ, which are longer in this division of the Neuroptera than in the last described, and in this species measure about half an inch, finely toothed on the inside, the teeth being longest near the base of the antenna, and gradually decreasing to about the fifth joint from the apex, when they assume the ordinary form, producing a beautiful tapering effect. The prothorax or neck is long, and of a square form, while the two remaining parts of the thorax, usually called the meso-thorax or middle, and the meta-thorax or hind thorax are prominent, and separated by a deep incision ; and the abdomen is very short compared with those of the preceding division, and of softer and more leathery texture. The wings are long and broad, expanding over three inches, and being more than half an inch in breadth at the widest part ; they are of a light smoky tinge, or ash-colored, with a few darker transverse streaks and spots. The veins or nerves are not so numerous as in the dragonflies, and are alternated with black and white. The larva is found in running brooks, and is only known to me by report.

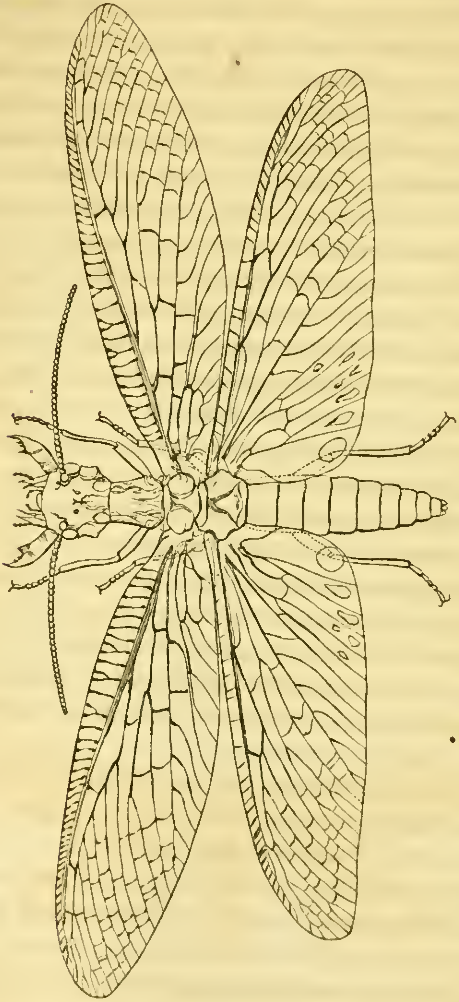

Fig. 32.

Corýdalis cornúta of Linnæus, or the horned Corydalis, is the largest Neuropterous insect found here, and the only one of the genus yet discovered north of Texas. It measures from two and a quarter to more than three inches from the tip of the mandibles or jaws to the end of the body, and the wings are five to six inches from tip to tip, (measured from specimens in the State Cabinet.) The wings are of similar texture and color to the preceding, but with larger and coarser markings, and frequently spotted with milky white dots. The mandibles of the male are extremely long and tapering, often measuring an inch or more from base to tip; those of the female scarcely a quarter of the length, but strong, thick, and furnished at the tip with four teeth. The antennæ of both are moniliform, or like a string of beads, and much the longest in the male. The body is dark brown above, spotted and streaked with yellow; the feet and under side lighter. Figure 32 represents a female of medium size. Figure 33 the larva, which is aquatic and found oftenest in mill-ponds. It is of a blackish color, marked with yellow somewhat like the perfect insect, and with branchial or gill-like organs on the sides of the abdomen.

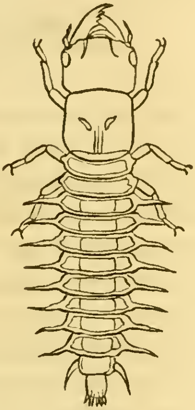

Fig. 33.

Polystœchotes (from *poly*, many, and *stoichos*, a row,) is represented in this State by one species only, the *punctátus* of Fabricius, (figure 34, *Harr.*,) signifying spotted or speckled. This insect is easily distinguished by the peculiarly regular veining of the wings, somewhat resembling the strings of a musical instrument. The body is blackish above, lighter beneath, eyes rather prominent, feet yellowish, fore-wings hyaline, spotted with fuscous and cinereous, or ashy; hind-wings very slightly marked on the margin, and hyaline in the centre, bordered with a very narrow black fringe interrupted with whitish. The larva is supposed to live like those of the preceding species, in the water.

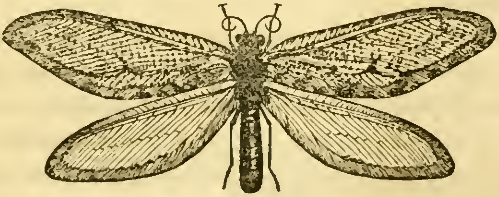

Fig. 34.

The genus *Chrysópa* of Leach, (meaning golden-eyed,) and commonly called "lace-wings," comprises several species bearing a close resemblance to each other, but all of the most useful character to the agriculturist, feeding as they do almost exclusively on the Aphides, or plant-lice.* The antennæ are longer than the body, and slender, of the shape called setiform or bristle-like; the wings hyaline with green or greenish yellow veins; the head, thorax, abdomen and legs, usually of a clear pea-green, and the projecting eyes often of a gold or shining metallic lustre. They vary but little in size, averaging about an inch and a quarter in expanse of wing, and scarcely half an inch in length of the body. Their eggs, (figure 35, female lace-wing and eggs,) are laid on twigs or leaves where the Aphides are abundant, and to prevent their being covered with the exudations of the Aphides and suffocated, or devoured by small predaceous insects, are fastened at the top of a small pedicle or stalk, spun from the abdomen of the parent, like the thread of a spider. The young hatched from these are of an elongated form, with sharp sickle-like jaws, with which they pierce the tender bodies of the Aphides and suck their juices; they are very voracious and destroy a vast number of these pests of the horticulturist during their larva-life; after arriving at their full size in this stage, they retire to some sheltered place and spin a whitish cocoon, almost perfectly round, and about the size of BB shot; these may often be noticed in the crevices of bark, under the upper rails of fences, and other similar localities.

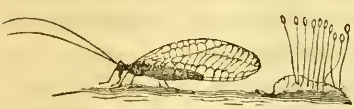

Fig. 35.

Of the genus *Myrméleon*, or ant-lion, we have in New England but one well known species, although many others are known to exist in the southern and western States.

The *Myrméleon obsolétus* of Say, or obsolete ant-lion (figure 36, *Harr.*,) is of common occurrence throughout the country. The specimen from which the figure was copied is in

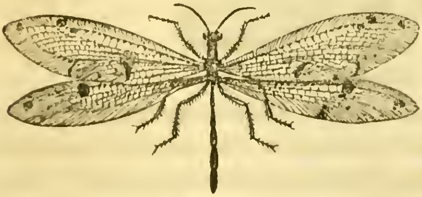

Fig. 36.

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* See the interesting accounts and descriptions of some of the species, in Dr. Asa Fitch's First Report on the Insects of New York, published in the Transactions of the New York State Agricultural Society for 1856.

the Cabinet of the late Dr. T. W. Harris, now the property of the Boston Society of Natural History, and not having one within my immediate reach I am obliged to extract the following description from Dr. Hagen's Synopsis, previously alluded to.

The general color of the insect is "luteous, (clay yellow,) face with a transverse, broad, fuscous fascia (band); antennæ long, the apex clavate, luteous, the base and apex black; labial palpi short, luteous, the last article longer, fusiform or spindle-shaped; prothorax elongated, narrower anteriorly, luteous, a little granulated with black; meso- and metathorax with a broad dorsal fuscous stripe, at each side a broad black stripe; abdomen black, a luteous dorsal band upon the middle of each segment; feet elongated, very slender, black; base of the anterior femora and apex of the tibial brown; posterior femora with a luteous band before the apex, tibiæ luteous, with the base and apex black, tarsi luteous, obscurer at the apex; spurs as long as the two basal articles of the tarsi, luteous; wings hyaline, beautifully spotted with fuscous; the anterior ones with an ocellate (eye-like) spot at the middle of the posterior margin, a double spot at the pterostigma, an apical interrupted series, and some points at the median nervure, fuscous; posterior wings with a larger orbicular spot before the pterostigma, and some apical spots also fuscous. Length to tip of wings, 1.36, alar (wing) expanse, 2.48." Specimens of this insect are sometimes found which differ from the above description either with the "wings not spotted, but hyaline or sprinkled with fuscous" or "costal space with a double series of areoles," or "without spurs."

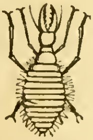
Fig. 37.

Figure 37 represents a larva of this genus, of somewhat rounded outline, furnished with short stiff hairs on the sides, and with long formidable toothed jaws. It is found in sandy places where it excavates a tunnel-shaped hole, and buries itself at the bottom, with the expanded mandibles scarcely appearing above the surface; in this position it awaits the approach of ants or other small insects, which, losing their foothold on the loose sand, fall easily into its open jaws; if, however, one of these should be warned of its danger and endeavor to escape, the ant-lion is said to come forth from its concealment, and by means of its broad flattened head to throw quantities of sand from the bottom or sides of the cavity toward its victim; this has not only the effect of deepening the hole and making its sides steeper but also of striking and overwhelming its prey causing it to tumble within reach of the ant-lion. The pupa of this insect is remarkable as possessing the extraordinary appendage of mandibles, which are used in cutting its way through the cocoon when about to transform.

The genus *Panórpa*, of Linnæus, (probably from *pas*, all; and *orpe*, or *arpe*, a spike or goad, sometimes a harpoon, in allusion to its being armed at both extremities with sharp pointed instruments,) is noticeable for its long rostrum or beak, and for the singular form of the last joint of the abdomen in the male, which is forcipated or pincer like, and by means of the flexible, and slender segments preceding it, can be bent in almost every direction. It is most frequently seen with this instrument curved over its back somewhat like the tail of a scorpion whence it has received the common name of "scorpion-fly." All the species known feed upon other insects, and may be found in bushy pastures throughout the country in the summer months. We find three or four species in Massachusetts, of which *Panórpa ruféscens*, of Rambur (figure 38, male, magnified,) is the most common. The rufescent or rusty scorpion-fly is, as its name purports, of a yellowish red color; antennæ black excepting the three or four basal joints which are reddish; ocelli black; feet light red or yellowish; wings yellowish with a few scattered spots, and two bands, one at the apex, and a narrower elbowed one a little behind the middle, fuscous. Length about half an inch, wings expand one inch.

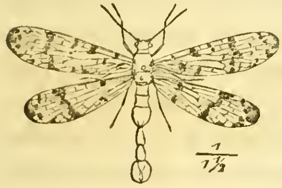

Fig. 38.

The family *Phryganína*, (from *phryganon*, a dead stick or faggot,) was so named by Linnæus, in allusion to the habits of the larvæ which construct a tube of sticks, or other substances, as a protection against their enemies. Being a whitish, plump grub, and slow in its motions the larva would form a delicate morsel for fish, or voracious aquatic insects of different species, were it not endowed with sufficient instinct to build a shelter for its existence in this state, and its succeeding transformations. In the bottom of almost every pool, or brook a curious structure composed of pieces of bark,-dead twigs, grains of sand, sometimes a bright green leaf, or even small shells, may be seen, apparently moving along without cause, but closer examination will discover a small, brownish head, and six legs, at one end, which are quickly retracted on being touched; these are the habitations of the larvæ, which feed mostly on aquatic plants, occasionally on weaker insects, and can scarcely be classed as beneficial species, although deserving mention on account of their peculiar habits and great variety of species. Before transforming to pupæ, they are said to close the mouth of the cell with a grating, which while it allows sufficient water to pass for the respiration of the insects, prevents the entrance of their enemies. The imagines of these singular creatures are commonly called "caddice-flies" or "water moths," and very closely do they resemble in general appearance some species of moths; their antennæ are long, and slender, their wings folding over and longer than the body when at rest, and of dull colors, while they take but little if any food in the perfect state, their mouths being weak and ineffective. They are, however, covered with hairs, instead of scales like the moths, and were on that account placed by some authors in the Order *Trichóptera*, or hairy-winged insects.

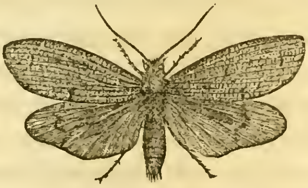

Fig. 39.

Neurónia semifasciáta of Say, (figure 39, *Harr.*,) or the half banded caddice-fly is one of our larger and most common species. It is of a tawny hue, antennæ ringed with fuscous; head fuscous; anterior wings streaked with fuscous, having a small spot near the base, and a short transverse streak about the middle of the hind margin of the same color; frequently also a similar streak from the anterior margin near the apex, dilating about the middle of the wing and enclosing one or two white points, a larger white dot midway between these, and the base; posterior wings tawny, without fuscous spots, excepting occasionally a few faint ones upon the apex, and a short elbowed fuscous band a little before the apex, not reaching either margin. It measures from head to tip of wings one inch or less, expands from one and six-tenths to two inches. There are an infinite number of species of this family, which are found in this State, but as they exert so little influence on the cause of agriculture, we shall not enlarge upon them here.

The Order *Hymenóptera* of Linnæus, contains, as its name implies, those species having membranous wings. All wasps, bees, and other insects having four wings, biting jaws, and a sting in the extremity of the abdomen, belong to this Order, together with the ants, gall-flies, ichneumons, and almost all the parasitic tribes which deposit their eggs, in the eggs or larvæ of others. The anterior pair of wings are the largest, and furnished with a small scale or plate at the base called *tégula*. Both pairs are crossed with veins running longitudinally and transversely, but much fewer in number than in the last Order, so that they do not form a close network. The areas or cells enclosed by these veins, varying as they do in form and size, are of great service in the classification and arrangement of different groups and genera. On the anterior margin of the hind wings can be seen by the aid of a lens or magnifier a row of small sharp hooks or claws bent toward the upper surface; these correspond to and unite with a sort of flange or groove on the under side of the hinder edge of the fore wings so as to expose a continuous surface to the air, in flight. The females are furnished with a complicated organ at the extremity of the abdomen consisting generally of five pieces, two of which close the opening, or act as additional sheaths, while the others are of various forms in different families according to the use for which they are intended; being flattened and the central one double and serrated in the saw-flies; apparently consolidated into a sharp sting in the wasps and bees; and long slender, and bristle like in the *ichneumons*, where they are used as *ovipositors*, or egg-laying instruments. In this latter tribe, which comprises some of the most beneficial of the Order, the two side pieces are grooved on the inside throughout their length, and when pressed together form a tube for conducting the egg to its place of deposit; the central piece being cylindrical, and finely toothed near the extremity, ending in a sharp point and fitted for piercing the bodies of grubs and caterpillars on which the larvæ feed.

The family *Tenthredínidæ*, (from the Greek name for a species of wasp or bee,) which contains the saw-flies and allied species; the *Uroceridæ*, (signifying horn-tailed, in allusion to their short and stout ovipositors,) which bore into trees, and feed upon the wood in the larva state; and the *Cynípidæ*, (*cynips* signifying a small piercing insect,) and comprising the gall-making flies, are all injurious to vegetation. The *Evaniídæ* of Leach, on the other hand, is composed of parasitic species, insectivorous in their habits, and is to be classed among the useful families.

Pelecínus polycerátor of Fabricius, is one of the most common of this family, and is found throughout the State. The female is of a polished black ; the head and thorax punctured roughly, elevated portions of the latter more finely so, almost smooth ; thorax on the sides and beneath, with short silvery hairs ; antennæ dusky black, except about two-thirds of the ninth, and the whole of the tenth article, which are almost white ; feet black with tawny hairs, tarsi somewhat fuscous, hind femora much enlarged ; wings hyaline with fuscous nerves, anterior pair smoky on the outer margin and tip ; abdomen exceedingly long, composed of six cylindrical joints, the first fusiform or spindle-shaped, the last very short and with a curved point at the apex, intermediate ones of nearly equal size ; ovipositor concealed. It measures two inches and a half or less in length ; wings expand about 1.20. The males of this species are extremely rare in collections ; they resemble the female in general appearance, but have a much shorter abdomen.

The family *Ichneumónidæ* of Leach, (so named from the little animal called the ichneumon, which was fabled to enter the throat of the crocodile and wage an intestine war on its huge enemy,) is not only one of the most extensive groups, but also one of the most beneficial and valuable to the cause of agriculture. It is distinguished " by having the abdomen attached to the thorax at its hinder extremity, and between the base of the posterior coxæ, first joint of the legs, by which they are attached to the body. The wings are veined, the anterior pair always exhibiting perfect cells upon their disc, (middle surface.) The ovipositor of the female is straight and often exserted, (projecting beyond the tip of the abdomen ;) the antennæ are always filiform (thread-like) or setaceous, (bristle-shaped,) not elbowed, and composed of more than sixteen joints," excepting in a few minute species, " and the pupa is enclosed in a cocoon ; the body is long and narrow ; the head is small and free ; the eyes more or less prominent and lateral.

* * * The wings are of moderate size; the stigma (a thickened opaque spot on the anterior margin of the fore-wing, nearer the apex) is large, and the costal margin (rib running along the anterior margin) is thickened, or rather the costal (rib) and subcostal (next behind the rib) nerves are confluent, so as not to exhibit a subcostal cell. The legs are long, and formed for running. * * * The abdomen is generally long and cylindrical, or elongate ovate, (long egg-shaped,) and narrowed at the base into a short peduncle, on each side of which is a small tubercle, in which a minute *spiracle** (breathing-pore) exists." Other characters of less prominence assist in defining this group, but the foregoing, copied from Westwood's Introduction to the Classification of Insects, will I think be sufficient to enable most observers to locate an insect belonging to this family.

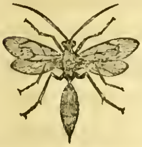

Fig. 40.

Ichneúmon suturális of Say, or the black sutured ichneumon, (figure 40, *Harr.*,) is a common species through North America, and attacks various caterpillars, of both moths and butterflies. I raised several specimens from the larvæ of *Leucánia unipúncta*, Haworth, or "army worm," which was exceedingly abundant and injurious in this State in the summer and fall of 1861. The following is Say's description: "Body pale ferruginous; antennæ black beyond the middle; trunk with black sutures; scutel (a small semi-oval plate on the back of the thorax) more or less tinged with yellow; wings tinged with ferruginous; carpus (the spot on the anterior margin of the fore-wing, usually called stigma) yellowish; nervures blackish; central cellule pentangular, (five cornered,) the side on the radial cellule rather smallest, basal and apical sides longest, not parallel; metathorax with slightly elevated lines in the form of an H; tergum (back or upper surface of the abdomen) with the apical sutures not black; basal segment with two slightly elevated longitudinal lines; tibiæ, posterior pair black at tip; venter, basal segment black; sutures not black; oviduct (egg-tube) not longer than the breadth of the anal segment." It varies sometimes in color, different specimens being sometimes of a yellowish hue, and the sutures not obviously black. The length from head to tip of abdomen is about .4 of an inch; wings expand .7 or more.

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* Insects do not breathe by means of lungs opening into the mouth or nostrils, but by small pores on the sides of the body, called *spiracles*, of which there are usually nine on each side.

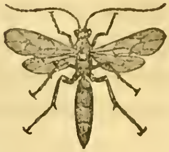


Fig. 41.

Ichneumon parata of Say, (figure 41, *Harr.*, male,) was also found in considerable numbers parasitic upon the "army worms," and is one of our commonest species. The prevailing color is black; head in front and base of the antennæ beneath yellow, both black above; orbits of the eyes yellow; thorax with two short yellow lines before the wings, almost confluent toward the head, a small yellow spot often divided into two lines in the middle between the wings; scutel yellow; tegulæ yellow, wings almost hyaline, stigma reddish yellow; metathorax with a large yellow spot often longitudinally divided through the middle by a black line, which is continuous with the black peduncle; abdomen black, with from two to four yellow bands; feet yellow, hind femora black, except the base, hind tibiæ black at the apex. Length .6 or more; wings expand about .9.

Trogus exesórius of Brullé, or the tawny Trogus (*exesórius*, from the Latin signifies eating out,) is of a tawny color throughout, the antennæ only being a little darker toward their tips and the wings of a deep smoky tint. It is more than three-quarters of an inch in length, and about an inch and a half across the wings. It is chiefly parasitic on the caterpillar of Asterias butterfly. *Papílio astérias* of Cramer, which feeds on the carrot, parsnip, fennel, parsley and other umbellate plants. We find in Massachusetts several species of ichneumons with the three bristle-like appendages of an enormous length, measuring three and even four times the length of the body. These belong to the genus *Pimpla* of Fabricius, and seem as though specially appointed to prey upon the wood-wasps or borers of the family *Urocerídæ*.

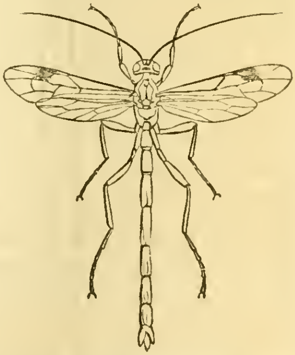


Fig. 42.

Pímpla lunátor of Fabricius, or the yellow spotted Pimpla, (figure 42, male,) (*lunate* signifies marked with crescent shaped spots,) is of reddish brown color spotted and striped with yellow, particularly on the sides of the abdomen in the female (figure 43, *Harr.*,) where the yellow color margins the tips of the segments, taking the curved shape which gives the insect its name, on the third to the seventh inclusive. The head is yellow, marked with a fuscous figure shaped somewhat like the letter U, between the eyes, which are united above by a fuscous band, behind the eyes another fuscous band extending almost completely around the head; the feet are brownish, moderately spotted and banded with yellow; the wings hyaline with fuscous veins, tips slightly smoky, and a smoky spot just behind the stigma, which is reddish yellow in the basal half and darker toward the apex. In one specimen in the State Cabinet the ovipositor measures nearly five inches in length. Female, 1.45 to 1.75 in length, excluding the ovipositor, wings expand about two and a quarter inches: male, length about the same as the female, wings expand a little more than one inch and a half.

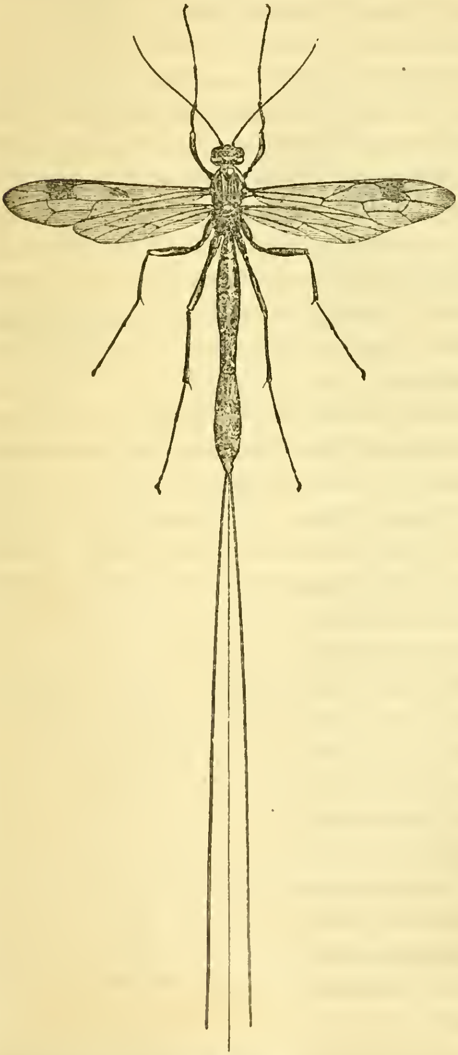


Fig. 43.

The genus *Ophion* of Fabricius, is well represented in this State, and is readily recognized by the form of the abdomen, which instead of being flat or rounded above, is sharp, and thinly compressed on the sides, or flattened especially toward the apex which is truncate or squarely cut, instead of being pointed. The claws of this genus are pectinated or furnished with teeth like a comb, this character, however, can only be noted by the aid of a lens or magnifying glass.

Ophion cecrópiæ, (so called from its being parasitic in the *cecropia* moth, the largest of our North American species,) is of a honey yellow color with hyaline wings. Several smaller species measuring about three-quarters of an inch in length, and from an inch to an inch and a half across the wings, resemble it in color, among these are the *bilineátus*, (two lined,) *geminátus*, (two spotted,) and *glabrátus*, (smooth) of Say. Some of these are often noticed flying about the lighted room on a summer evening and striking against the ceiling; they are capable of making a slight wound with the ovipositor, but do not possess any reservoir of poison to aggravate it as is the case with the bees and wasps. *Ophion mundus* of Say, is common in bushy pastures and readily attracts notice from its shining black color, and bright yellow antennæ. The wings are of a uniform, smoky tint with purple reflections; the feet, of which the hind pair are the largest and longest, are varied with yellow and black, the hind pair yellow from the apex of the femora to the tip excepting a black ring around the tibia at its apex.

Figure 44, (*Harr.*) represents a species of the natural size and magnified, that is parasitic upon the caterpillar of *Chœrocámpa pampinátrix* of Smith, one of the most noxious enemies of the grape-vine; the insect figured is of a polished black color and of quite small size, but by the aid of the ovipositor (seen at the extremity of the abdomen) pierces the skin of the naked caterpillar in several places and deposits in each wound a minute egg. The larvæ hatched from these continue devouring the fleshy parts of the caterpillar until they arrive at their full size when they emerge from its body and spin each for himself a small white cocoon on the surface of the skin, in which they complete their transformations in a very short time and make their escape by separating with their mandibles a small round lid from the top of the cocoon as seen in figure 45, (*Harr.*,) which represents the caterpillar covered with a dozen or more

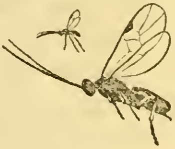


Fig. 44.

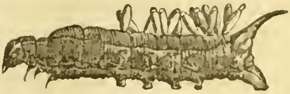


Fig. 45.

of these small cocoons from most of which the parasites have made their escape. I have no specimen of the perfect insect at present within my reach, from which to describe more particularly, but it will be recognizable in all probability from the foregoing figures and history, and be easily raised from the cocoon and set free in the neighborhood of grape-vines infested by the *Chærocampa*, or hog-caterpillar, with a view to destroy them. It has been the practice in Europe, for some time, to rear and scatter parasitic Hymenoptera of different species among the insect enemies of various crops, which are found to be their appropriate food ; this plan has been crowned with noted success and I learn has already been inaugurated on this side of the water, by the enterprise of the New York State Agricultural Society, and when more generally published among agriculturists will no doubt be found one of the most simple and efficacious means of ridding ourselves of many insect pests. The caterpillars containing the eggs of this and similar species, may be known even before the external cocoons are formed, by the small, black punctures disposed in an irregular manner and plainly visible on various parts of the body. Cocoons of parasites are often found of a silky white or yellow color attached in a mass to stems of grass and various other plants, and should never be destroyed or molested, unless it is desirable to remove them to some place where the insect known to be the food of their respective tenants is more abundant, or for the purpose of examination and study.

The *Aphídii* or parasites of the *Aphides*, (plant-lice,) are generally placed in a subdivision of the *ichneumons* called *Braconídæ*, and although of small size (being less than one tenth of an inch in length) are of infinite service to the cultivator. The indefatigable State Entomologist of New York, Dr. Asa Fitch, has described several new species in the agricultural report of that State, for 1860, from which I take the liberty of extracting the following descriptions of two that were found throughout New England, contributing in no slight degree to check the ravages of the grain-aphis, as it is called, that threatened the grain crops a year or two since.

"*Aphídius* (*Toxáres*) *triticáphis*, Fitch. Wheat-louse Aphidius. Black, shining, antennæ thread like, longer than the body, twenty-five jointed. Length, .08. Head transverse, convex in front, concave at base; face clothed with fine short hairs; eyes lateral, rather small; eyelets (ocelli) three, placed in a triangle upon the crown; feelers, dull white, bearded, five-jointed, the joints nearly cylindric, separated by intervening pedicels, the last one elliptic and shortest. Antennæ, .10 long, filiform, bearded with short inclined bristles, composed of twenty-five cylindrical joints; basal joint thickest, top-shaped, a third longer than thick, receiving into its apex the second joint, with which it is compactly joined, and which is thicker than the following ones, a third longer than thick, and slightly narrowing towards its apex; third joint longest, and rather more slender than the following joints, faintly thickened or swollen near its base, and also at its apex, and showing when greatly magnified a minute transverse joint interposed between it and the second; fourth joint a third shorter, more than four times as long as thick; remaining joints successively diminishing in length, the last one more than twice as long as thick and of an oval form. Thorax egg-shaped, and rather broader than the head; abdomen flattened, a little longer than the thorax but scarcely as broad, long oval, more narrowed anteriorly and bluntly rounded at tip, highly polished, its hind part clothed with short hairs which are more dense at the tip. Legs black, brownish at base and on the knees; wings transparent, slightly smoky, strongly iridescent red and purple, fringed on their hind edge, more conspicuously so on the hind pair; stigma dull, pale brown; veins brownish black.

" *Aphidius* (*Praön*) *avenaphis*, Fitch. Oat-louse Aphidius. Black; legs honey-yellow, and also the base of the abdomen and a sub-basal band; antennæ as long as the body, thread-like, twenty jointed. Length .10. Head black and shining, square when viewed from above, and twice as broad as long; eyes oval, slightly projecting, occupying the fore part of each side; eyelets on the crown, appearing as three elevated shining dots forming the corners of a triangle; mouth and feelers very pale yellow, the latter appearing as very slender threads jutting from the mouth and as long as the head; antennæ about as long as the body, filiform, rather thick and robust, black, the basal joint often pale in its under side, joints nineteen or twenty, clothed with a short inclined beard; two first joints shortest and compactly joined together, the basal one obovate and thickest; remaining joints cylindric, about thrice as long as thick, narrowed at their bases and cut off transversely at their tips, separated by short pedicles; last joint longer usually than its predecessor, egg-shaped. Thorax broader than the head, more deep than wide, egg-shaped, black and shining. Abdomen as long as the thorax but narrower, oval, viewed laterally broadest at the tip, highly polished, brownish black; first segment narrower and forming a cylindrical pedicle, bright honey-yellow; a dull yellow or olive band or spot on the suture between the second and third segments. Legs honey-yellow; feet black, except at their bases, sometimes wholly black, with the shanks dusky. Wings transparent, slightly smoky; veins of the anterior pair coarse, black or dark brown, becoming abruptly more slender, colorless and almost imperceptible on the hind part of the wing; stigma long triangular, salt white; a single large irregular cell occupying the middle portion of the wing and bordering the stigma on its inner side, a short coarse transverse veinlet bounding this cell at its hind end, the two longitudinal veins between which this veinlet is placed becoming slender and abortive a short distance back of it, the outer vein remaining coarse twice the length that the inner one does, after passing the veinlet."

The family *Chalcidídæ*, (from the Greek *chalcos*, copper, in allusion to the brilliant metallic lustre of many of the species,) contains many insects which are to be regarded as beneficial, although some are parasitic upon different species of bees and wasps. They are generally of small size, the first joint of the antennæ long and erect, and the remaining joints bent or elbowed at this point; the hind femora much enlarged or swollen, and toothed beneath, the tibiæ have a corresponding curve and fit closely to the under surface of the femora when contracted; the abdomen is generally attached to the thorax by a small peduncle.

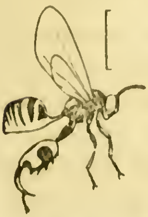


Fig. 46.

Figure 46 (magnified; the perpendicular line shows the length of the body,) represents a species belonging to the genus *Chálcis* of Fabricius, which I have never seen described. The prevailing color of this insect is lemon-yellow, inclining to greenish, anterior and middle pairs of feet paler; antennæ thirteen jointed, black with short close pile, except the basal joint, which is long, covered with yellowish hairs like the face, and having a yellow line beneath from its base almost to the extremity; front yellow, with a dark fuscous streak between, and a broader one each side of the antennæ, the central streak dividing about the middle and enclosing a rhomboidal yellow spot containing a small fuscous dot of similar form; vertex black, punctured; eyes narrowly margined with yellow, and two small yellow spots between the ocelli; thorax black, roughly punctured, clothed with scattered yellow, or reddish hairs, prothorax above with a transverse yellow band, narrowing very much at the sides and expanding below into the anterior pair of feet, mesothorax with two abbreviated yellow lines, nearly confluent toward the scutel; tégulæ black, punctured with yellow margin, and a small yellow spot just behind the tégula, on the mesothorax; scutel large, greenish yellow, punctate, an abbreviated black band nearly dividing it through the middle; peduncle yellow, surrounded by a thin hyaline collar at its base, more than one-third as long as the abdomen; abdomen greenish yellow, with two black spots, followed by five sutural bands of the same color, gradually diminishing in width to the apical one; tip of the ovipositor almost concealed, fuscous; posterior coxæ polished black, slightly yellow near the base beneath; femora greenish yellow, swollen, lenticular, seven or eight toothed, a large rounded black spot before the middle, curving narrowly backward beneath, including four teeth, and expanding slightly at the apex, an abbreviated slender black line above, and a large irregular black spot covering nearly the whole inner surface, and almost surrounding a small yellow spot near the apex; tibiæ black at base, remainder of their length, as well as the tarsi, light yellow; wings hyaline, faintly tinged with smoky, having a fuscous stigma and light brown veins.

The specimen from which the figure and description were taken, is the only one I have seen, and is a female; if it should prove to be hitherto undescribed, it may receive the specific name *bracata*, (breeches-wearing,) in allusion to the ornamental and trousered appearance of the posterior feet. It is about .32 in length.

To this family also belong the small *Pteromali*, which attack the larvæ of various moths and butterflies, and deposit sometimes over one hundred eggs in a single caterpillar. I have repeatedly found the chrysalides of our common Antiopa butterfly filled with the minute white larvæ of a *Pterómalus*, so closely packed that it seemed impossible for them to find room to pass through their transformations. It is, however, a well established fact, that in cases where insectivorous larvæ find themselves too numerous for convenience or safety, they will not hesitate to restore the balance by devouring their brothers and sisters.

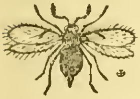


Fig. 47.

The family *Proctotrúpidæ* of Stephens, comprises also many minute species which are extremely beneficial to the agriculturist. One genus, *Platygaster*, is mentioned in Dr. T. W. Harris's Treatise as attacking the Hessian fly; and another species of the same genus, (figure 47, *Harr.*, female magnified, the small cross lines at the right show the natural size,) is found very commonly in the egg of the canker-worm moth, and without doubt at least one-third of the eggs are thus destroyed by this minute parasite. Figure 48, *Harr.*, represents a cluster of the eggs of the canker-worm moth, of the natural size, and five eggs at the right magnified.

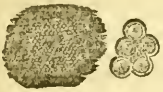


Fig. 48.

In the section of the Order Hymenoptera, of which we have been speaking, we find no highly concentrated poison secreted in glands at the base of the ovipositor, which is calculated almost solely as an instrument for laying eggs, and used only subordinately as a weapon of defence. We now come to a division where this instrument is modified in its form, and converted into a sharp needle-like apparatus, which contains in a groove on its under surface two still finer and sharper weapons, slightly notched toward the tips, and connecting with a poison sac at the base in the females, as well as with the ovaries. The poison is of an acid nature, so that when suffering from a sting of a wasp or bee, we find liquid ammonia, or hartshorn, which is a strong alkali, to be an excellent antidote, as it neutralizes the poison and relieves the pain. The antennæ in this division consist generally of thirteen joints in the males, and twelve in the females; the abdomen of seven joints in the males, and six in the females; the wings are veined, and the larvæ are footless. To this section belong the ants, wasps and bees; the first can hardly be considered as of particular benefit to the farmer; the bees are sufficiently well known as furnishing not only honey and wax for the use of man, but are of the greatest importance in the fertilization of many plants, by conveying the pollen from flower to flower. It is with regard to the much abused wasps that something need be said, as although they may refresh themselves with an overripe grape, or choice apricot on occasion, their chief food in the larva state consists of other insects; many species living entirely upon flies, a large majority upon the caterpillars of various moths, and others still upon spiders. These are collected by the parent and entombed in the nests which they construct for the reception of their eggs, being previously wounded or otherwise disabled from injuring the egg or tender larva of the wasp, but retaining sufficient vitality to preserve them fresh for the food of the young, which begin to devour this provision as soon as excluded.

Pelopæus cœrúleus of Linnæus, the blue mud-wasp, is one of the most common species in this country, and as its name implies, of a bright steel-blue varied with violet or purple reflections upon the wings, which are quite opaque, and in the females expand about 1.25; the antennæ are dull black, with a greyish pile, and the head and thorax rather thickly clothed with short black hair; the abdomen is attached to the thorax by a peduncle nearly as long as itself. The males are about .60 in length, and the females .75.

Polístes fuscáta of Fabricius, or the common brown wasp, is of a dark brown color, lined and spotted with reddish, or tawny yellow; the wings are smoky, hyaline with a fulvous stigma, and the *tarsi* are pale yellow; the peduncle connecting the thorax and abdomen is much shorter than in the preceding species, and the head and body are clothed with a close silky pile, giving it a lustre like satin. It is about the same size as the last.

Our largest paper-making wasp, the *Véspa maculáta* of Linnæus, or spotted wasp, (figure 49,) is commonly known in this country by the name of "white-faced hornet." In this genus the abdomen is sessile or fitting closely and squarely to the hinder part of the thorax, when

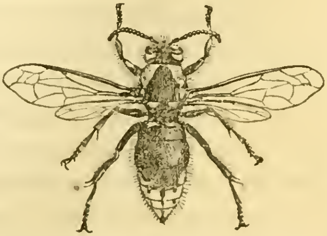


Fig. 49.

the body is in a horizontal position, but is connected only by a minute articulation on the lower part of its base, so as to admit of free motion and great flexibility. The antennæ are black above, becoming dusky toward the tips; beneath, the first joint whitish, the next darker, the third partially black, and the remainder fulvous. The head is whitish in front, marked with a distinct black **T**; above this a square white spot between the eyes, which are also indented with white, and a small oblique black patch running backward from the base of each eye; on the vertex and behind the head is black, a broad yellowish white band beginning above the base of the mandibles, bounding the eyes behind; thorax black, with a narrow whitish collar sending out two diverging whitish stripes to the base of the wings; tegulæ whitish at base, black and reddish at tip; below the base of the wings on each side a large sub-triangular whitish spot; abdomen black above, except the three last segments, which are whitish behind with black sutures, and indentations in front, and a longitudinal black line down the middle. It is from .55 to .75 in length.

This and the common "yellow jacket," *Vespa vulgaris*, are often seen employed in catching flies and other insects, and in some parts of the country the large grey nest of a society is suspended in the house for the purpose of clearing it of flies.

The genus *Euménes* of Latreille, noted as feeding its young on canker-worms and similar geometric larvæ, the genera, *Bembex*, (a spinning-top,) and *Crabro* of Fabricius, and *Odynerus* of Latreille, (from the Greek, meaning painful,) are among the most useful of our insect destroyers; and although many are guilty of pilfering sweets and nibbling fruit at times, beside being capable of inflicting painful wounds on human beings when molested, they should nevertheless be placed in the beneficial class.

The Order HEMÍPTERA, containing the bugs, plant-lice, cicadas, tree-hoppers, and other insects furnished with a short jointed sucking-tube in place of jaws or mandibles, presents a great variety of forms, and modifications of character. It is usually divided into two sub-orders; the one which includes those species having the fore-wings distinctly stiff and hard on the basal part, and membranous and flexible on the apical extremity, is called HETERÓPTERA from the Greek signifying other, or different wings. This section comprises the "boat-men" "water-skaters" and many other aquatic species, all insectivorous, the *Reduviídæ* of Stephens, and other terrestrial groups, containing some of the most useful destroyers of insects, and a number of families almost exclusively herbivorous, and among the enemies of mankind, such as the bed-bug, squash-bug, plant-bugs of various kinds found on fruit and generally of an offensive smell and taste. The other sub-order *Homóptera* from the Greek meaning similar wings contains the vegetable-devouring species such as the Aphides, the vine and tree-hoppers, the harvest-flies, and the scale-insects or *coccidæ* all of which subsist by sucking the sap of various plants, and are of great damage to agriculture. Many of the scale-insects, however, furnish mankind with substances of infinite value in the arts. The lac so extensively used throughout the world in the manufacture of varnishes, sealing wax, &c., is produced by the punctures of the *Coccus ficus* of Fabricius; the manna, which according to ancient history preserved the children of Irsael from starvation, and is used in the East to the present day as an article of food, is the production of another species of this wonderful family; and the Mexican *Coccus cacti* furnishes the invaluable red coloring-matter known by the name of cochineal.

The most prominent of the *Heteróptera* that are found in this State, feeding upon other insects are the following: the *Notonéctidæ*, from the Greek, meaning back-swimmers, and often called boatmen, these are seen just beneath the surface of any still pool resting with the long hind-feet at right angles with the body, the tip of which just reaches the surface, while the head and body hang at an angle of several degrees. When disturbed they ply their oar-like feet with great rapidity steering for the bottom of the pool, but soon return to the top and keep watch for any unfortunate insect that may fall into the water, or the water-inhabiting species that are weaker and less active than itself. Figure 50 represents a species common in this State called *Notonécta unduláta* by Say, or the wavy boat-man. It is of a greenish white color above, with a black scutel, the anterior part of which seen beneath the semi-transparent thorax, tinges it with dusky or blackish; the hemelytra or wing-covers are marked with brownish spots or streaks, those behind the middle

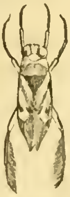


Fig. 50.

forming a wavy, irregular, transverse band; the body beneath is greenish yellow varied with black, and the feet are green; the rostrum or beak with which it sucks the juices of other insects, is rather short and curved beneath the body when not in use, as is the case in most of the insects of this Order. It measures less than .45 in length.

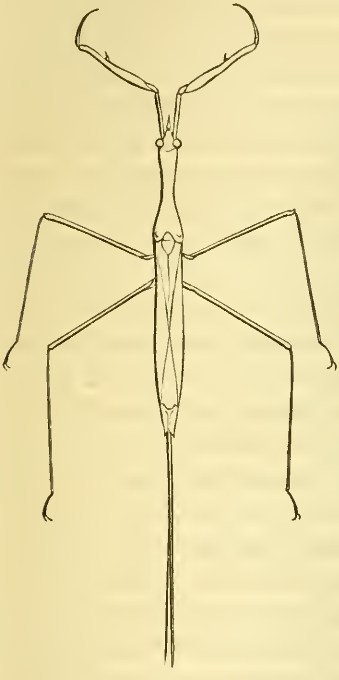


Fig. 51.

Ranátra fusca of Palisot de Beauvois, or the fuscous Ranatra (the generic name seems to be derived from Rana, a frog) (figure 51) is one of the most singular of our native water-bugs. It belongs to the family *Nepidæ* of Leach, or water-scorpions, containing the genera *Nepa*, of Linnæus, *Ranátra* of Fabricius, and *Belostóma* of Latreille, all represented in Massachusetts. This insect is very long and slender, of a nearly uniform light brown color above and paler beneath, the rostrum is exceedingly short and projects in front between the prominent black eyes, the antennæ are invisible, but the long and curved fore-feet are raised and brandished before the head, and seem particularly fitted for seizing their prey, while the hinder ones are still longer and more attenuated and are used as oars to propel the insect along the surface of the water; the tip of the abdomen is furnished with two long setæ or bristles, which may aid it in balancing itself upon the water when struggling with another insect, or in directing the laying of its eggs; the wings are long, narrow, and folded closely upon its back not reaching the tip of the abdomen. It measures about 1.55 to the tip of the abdomen, and including the anal setæ, over 2.75.

The family *Hydrométridæ* of Leach, or water-measurers, contains among others our commonly known water-skater, *Gerris paludum* of Fabricius, or the skater of the marshes, (figure 52,) seen on every brook and pool during the summer swiftly

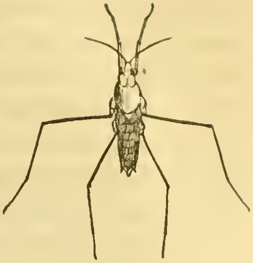


Fig. 52.

gliding over the surface in pursuit of its food. Its body is dusky black above, the feet and hemelytra of the same color; beneath, silvery white; it measures about .60 in length, and scarcely .12 across the widest part of the thorax; the second pair of feet are exceedingly long, and the posterior pair but little less, the fore-feet being short and stout and fitted for grasping. Several others of this family are common to Massachusetts and are to be regarded as somewhat beneficial, inasmuch as they seize and destroy many noxious insects which have fallen into the water by accident and would if not captured by the inhabitants of this element make their escape and continue their work of destruction.

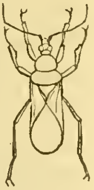


Fig. 53.

Of the terrestrial or land inhabiting Heteróptera the family *Reduviídæ* of Stephens, is perhaps the most serviceable to mankind. They are found upon plants of all kinds piercing the tender bodies of vegetable eating insects and sucking their juices. *Pirátes pícipes* of Herrick Schæffer or the pitchy-footed Pirates (figure 53,) is one of the most common in Massachusetts. It is of a deep black color with hairy antennæ and feet and measures about .6 in length. *Nabis ferus* of Fabricius, or the savage Nabis, a much smaller insect of a yellowish brown color, the hemelytra spotted and lined with fuscous, and a much longer and more slender rostrum than the last, is equally common in this State and feeds upon various small insects of tender consistence. It measures about .25 in length. Various species belonging to the typical genus *Redúvius* are also found here, one of the most remarkable of which is the *Redúvius personátus* of Linnæus, or masked Reduvius, probably introduced into this country from Europe. It is often found in and about houses, is said to feed chiefly on the bed-bug, *Cimex lectularius*, Linnæus, and is noted for its peculiar habit of collecting and clothing itself with bits of lint and particles of dust, so as to present a very odd appearance. This habit is persisted in only during its larva and pupa stages, and so faithfully that a specimen enclosed in a box, with no material for this purpose, is recorded to have divested its cast off skin of this coating of dust in order to re-clothe its nakedness. The imago is not unlike our figure of the pitchy-footed Pirates above, in general appearance.

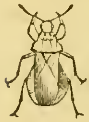


Fig. 54.

Phymáta erósa of Fabricius, or the eroded Phymata, (figure 54,) (the generic name is derived from the Greek *phyma*, a swelling or tumor and was applied to this genus on account of their enlarged anterior feet,) belongs to the family *Tingidæ* of Westwood, and is unlike most of its congeners a friend of the cultivator. It is pale green, with dark brown head, thorax and hemelytra, the terminal joint of the antennæ elongated and swollen, of the same color, and a band across the widest part of the abdomen. The head is indented before with a deep longitudinal groove on its upper surface; three similar grooves on the thorax, as if gnawed by the teeth of a small animal, give it the trivial name of *erosa* or gnawed; the abdomen is angularly dilated behind the middle and not covered by the wings, and the tibiæ of the anterior pair of feet enormously enlarged, the curved tarsi fitted to their circumference when folded. The specimens in the State Cabinet vary in length from .30 to .40 and in breadth of the abdomen across the dilation from .15 to .22. These insects have been taken in great numbers upon the linden trees in the city of Boston, and were seen in the act of devouring the Aphides which have infested the shade trees of this city for several years past. They are described by a gentleman who watched their operations with great interest, as "stealing up to a louse, cooly seizing and tucking it under the arm, then inserting the beak and sucking it dry." They are supposed to feed also on other vegetable-eating insects as well as the plant louse.

The Order Díptera, or two-winged insects, containing the mosquitos, gnats and flies, is distinguished from all others, by the apparent absence of the posterior wings; the place of these is supplied, however, by two small filaments clubbed at the tip, called hálteres, poisers, or balancers, while the fore-wings are fully developed in most of the species, and perform all the functions of both. They are in general furnished with a fleshy proboscis, containing various pointed and barbed piercing instruments, and their tarsi are composed of five articles or joints. Their habits are extremely various, and their number beyond computation. Some pass their larva and pupa stages beneath the water, like the *Neuroptera*; as, for instance, the mosquitos. Others in these stages feed on the blood of living animals, as the bot-flies and gad-flies; many species subsist entirely on toad-stools and other fungous plants; many construct galls on various annuals; the blow-fly and others of that class live upon putrifying animal matter; the common house-fly passes its preparatory stages in excrement; the *Tachínidæ* glue their eggs on the skin of various caterpillars, and their larvæ enter and devour the juices of the animal, resembling the ichneumon in their habits; some are said even to attack and feed upon the eggs or bodies of spiders, the traditional enemies of the race, thus consummating a species of poetic retribution. The Hessian fly, the wheat-midge, the onion-fly and others, are among the most noxious of insects. The black-fly, *Simúlium*, the mosquito, *Culex*, the golden-eyed forest-flies, *Chrysops*, the *Tabanídæ*, or horse-flies, and others, are the cause of intense annoyance and irritation during the hot months, to both men and animals.

Among the flies that may be considered as beneficial to the farmer, are the *Bombyliidæ*, or bee-flies, whose larvæ are supposed to be parasitic on certain vegetable-eating species, and whose imagines subsist on the nectar of flowers, being furnished with a long slender attenuated proboscis, adapted to sucking liquids. Figure 55 (*Harr.*) represents one of this species, supposed by Dr. Harris to be the *Bombýlius æqualis* of Fabricius, or equal-winged bee-fly, so called because the color of the wings is nearly equally divided, one-half being fuscous, the other hyaline. The body of this fly is thickly covered with golden yellow hairs, which are whiter beneath; the figure represents it of the natural size.

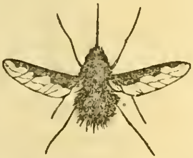


Fig. 55.

Laphria thoracica of Fabricius, or the Laphria, (from the Greek, meaning a forager, or robber, in allusion to its predacious habits, or from *Laphrius*, an appellation of Mercury, on account of its swiftness,) with a yellow thorax, (figure 56, *Harr.*,) is often seen in sunny clearings, pouncing upon other insects, with a deep hum, much like that of an humble-bee, which the Laphrias closely resemble in general appearance. The species figured is of a

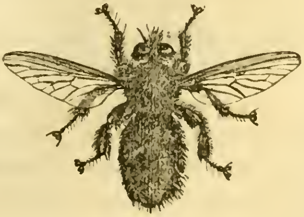


Fig. 56.

black color, with a broad short head and laterally prominent eyes; on the face in front a thick tuft of long yellowish hairs, and a smaller tuft behind each eye; the thorax is broad, and slightly rounded above, covered with long yellowish hairs, two tufts of the same color beneath the base of each wing; the abdomen is slightly broader than the thorax in the females, and covered with long black prostrate hairs, the three basal segments in some specimens are covered with hairs of the same color as those of the thorax; the feet are long, clothed with blackish hair, except upon the femora and tibia of the first and second pair, where it is mixed with yellow, especially beneath; the wings are hyaline, excepting where crossed by the stout fuscous veins, which are narrowly bordered with a smoky tinge. It measures an inch or more in length, and the wings expand about 2.10.

Asílus seríceus of Say, or the silky Asilus, (the generic name was used by the ancients to denote a species of gad-fly,) (figure 57, *Harr.*,) is the representative of a large number of species which live in the imago stage upon the juices of weaker individuals, especially those belonging to the same Order. The species here represented is described by Dr. Harris as devouring the roots of the tart rhubarb, when in the larva state, but as it fully compensates for this after acquiring its wings, by destroying myriads of more noxious insects, this and all the species of the same family may be ranked among our benefactors. "It is of a brownish yellow color, covered with a short silky down, varying in different lights from golden yellow to brown, and with a broad brown stripe on the top of the thorax. The wings are smoky brown with broad brownish-yellow veins, and expand one inch and a quarter or more." It measures in length from .8 to 1.10.

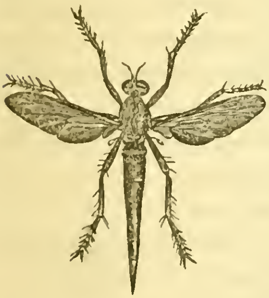


Fig. 57.

Midas clavátus of Drury, or the club-horned Midas, (called in Harris's Treatise *Midas filátus*, or the orange-banded Midas,) (figure 58, *Harr.*,) is the largest species found in this State; it is less common in the eastern part than the *Laphria thorácica* described above, but according to Harris,

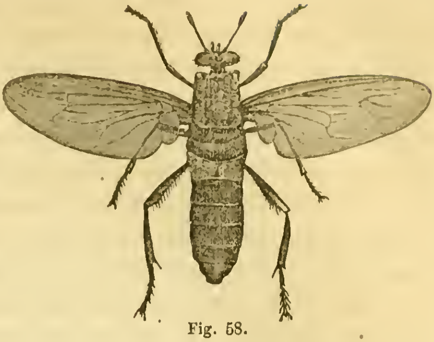


Fig. 58.

"may often be seen flying in the woods in July and August, or resting and basking in the sun upon fallen trees. * * * Its larva and pupa almost exactly resemble those of the rapacious Asilians. The larva is a cylindrical whitish maggot, tapering before, and almost rounded behind; it has only two breathing holes, which are placed in the last ring but one; and it grows to the length of two inches. It lives and undergoes its transformations in decayed logs and stumps. The pupa measures about an inch and a quarter in length; it is of a brown color, and nearly cylindrical shape; its tail is forked; there are eight thorns on the fore part of its body; and each ring of the abdomen is edged with numerous sharp teeth like a saw, all these teeth pointing backwards except those on the back of the first ring, which are directed forwards. The pupa pushes itself half way out of the stump when the fly is about to come forth, and the latter makes its escape by splitting open the back of the pupa skin." The imago is black, with the second segment of the abdomen orange-colored above; the wings are of a shining fuscous tint, and the antennæ are longer than those of most rapacious flies, and clavate, or ending in a swollen club-like appendage. It measures about 1.25 in length, and 2.25 across the expanded wings.

Pyrgóta undata of Weidemann, or the wavy Pyrgota, (the generic name meaning indented, or marked, like the battlements of a tower; Macquart says this name was bestowed in allusion to the pyramidal form of the head,) (figure 59, *Harr.*,) is very often found in the eastern part of Massachusetts, flying into lighted rooms in the evening; I have captured several specimens within a few minutes by exposing a lighted lamp in the window at night, toward the end of June. It is of very

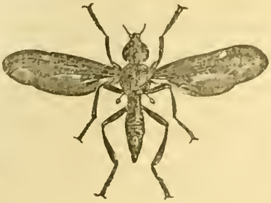


Fig. 59.

slender form, with conical head, at the apex of which the antennæ are placed ; the abdomen is broadest about the middle, but is apt to shrink disproportionately in drying, as was the case in the specimen from which the above figure was taken. The general color is light brown, the wings with a hyaline spot on the anterior margin, and two hyaline curved streaks behind the middle, bordered with an undulated, smoky, interrupted band. The general reddish brown color of the wings, which is darkest toward the base, is often diversified by three or four small hyaline spots, two just behind the large marginal one, and the others near the tip. It is about .65 in length, and the wings expand from 1.25 to 1.42.

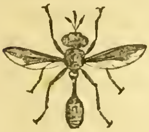


Fig. 60.

Figure 60 (*Harr.*) represents the *Conops sagittárius* of Say, or the archer Conops. (The generic name was applied by the ancients to a kind of fly, and the name *sagittarius* was given to this species on account of the arrow-shaped markings on the front, or in allusion to the form of the antennæ, which are parallel nearest the head, but diverge at their tips, in the shape of the feathered end of an arrow ; the line seen between the antennæ, in the cut, represents the apex of the proboscis or piercing apparatus.) It is black, the front of the head yellowish white, with a few black lines in the shape of a broad arrow ; the feet pale, except the femora, and tips of the tarsi, and the sutures of the abdomen whitish. The wings are fuscous on the anterior side, hyaline, and iridescent behind, as represented in the foregoing figure. It is said to be parasitic in its larva state on the humble-bee, and to undergo its transformations in the abdomen of those insects. It measures about .6 in length, and the wings expand from .75 to .80.

The *Syrphidæ* of Leach, (derived from a Greek word, signifying a mixed crowd, in allusion to the varied forms and habits of the insects composing this family,) contains a great number of genera and species, many of which are entirely innoxious, and others of great service to the cultivator, especially those belonging to the typical genus, which feed upon the Aphides. These are generally found in the imago state hovering about flowers, but as larvæ they are among the most merciless enemies of the plant-lice. They are of smaller size than any we have figured in this place, with hyaline wings, and bodies of brilliant colors, in which golden yellow predominates, the abdomen in many cases being banded alternately with this color and reddish brown or black. Some species belonging to this family live in the nests of humble-bees, upon the larvæ of which they feed ; others pass their preparatory stages in rotting wood, manure, or stagnant water, and a few are sometimes injurious to the cultivator.

The family *Múscidæ* of Westwood, comprises hundreds of genera, and several thousand species, among them not only the house-fly, the blow-fly, the onion-fly, and other annoying and hurtful insects, but also those included in the genus *Tachína* of Fabricius, (from the Greek, meaning swift,) to which we are indebted for the destruction of multitudes of noxious caterpillars ; the parent fly gluing her eggs to the skin of the caterpillar, on whose flesh the larva feeds. Several species of this genus are found in this State, and one or two at least contribute in no small degree to check the increase of the "army worm." Benjamin D. Walsh, Esq., of Illinois, discovered a new species attacking the same insect in the West, and has given a description of it in a very interesting and valuable paper, entitled "Insects Injurious to Vegetation in Illinois," which was published in the Transactions of the Illinois Natural History Society for the year 1861, and contains the results of careful study and observation.

I have endeavored to give in the foregoing pages a few facts in favor of our insect friends, and hope, notwithstanding the brief space allotted to this subject, to awaken such an interest in this branch of Natural History, as will lead others to study it for themselves, and obtain sufficient information to be able to distinguish the good from the evil. I am fully aware of my inability to treat the subject as it deserves, but "every little helps." I believe that the study of Entomology may be made of practical value to the farmer, and hence I have devoted considerable time and labor to this task. Care has been taken to explain all unusual terms, so as to enable any one who is anxious to learn something of this science, to read the more technical and valuable works of learned authors understandingly.

By a vote of the Board at the meeting in December, the Secretary was directed to prepare and submit some account of

A TRIP TO EUROPE.

The preceding papers occupy so many pages of this Report, that want of space will explain the absence of an introduction.

We arrived at Liverpool at ten o'clock on a Sunday morning, the 22d of June. Taking up a paper, the first thing that strikes the eye is a notice of the exhibition of the Royal Agricultural Society, to open the next day, at Battersea Park, in London. Not a day, therefore, for Liverpool. The old Roman town of Chester, the dairy farms of its neighborhood, and the picturesque hills of North Wales, now in sight, must be left to a future time. Not an hour is to be lost of the great metropolitan Cattle Show.

And so, without delay, the first train in the morning finds me on the way up to the capital. The journey from Liverpool to London, a distance of two hundred miles, possesses little of interest in a picturesque point of view. The country is flat for the most part, and we glide along through parks and fields divided by green hedges, for the want of a better material for fencing, through busy manufacturing towns, sending up their clouds of black smoke which linger in the murky atmosphere, passing the country seats of the rich proprietors of these acres, and now and then, a time-worn ruin of some feudal castle. The journey is soon over.

Once arrived in London, the first object is to obtain information. Where are the objects of interest now crowding this great metropolis? Where is Battersea Park? Where is the International Exhibition? Where is the Crystal Palace, where the grand Handel Festival is to take place? A guide-book is necessary for the navigation of this labyrinth. But first for the letters of introduction. Some of my future acquaintances must be more or less connected with the exhibition of the Royal Agricultural Society. That lasts but ten days, and is soon over, while the World's Fair will continue long enough to suit my convenience.

Through the kindness of a member of the Board I had been favored with letters to the Earl of Powis, who preceded the late Prince Albert, as President of the Society, and who must still be a member of the Council, and able to give me the fullest and most trustworthy information. As soon as practicable, therefore, I called upon his lordship, who received me very cordially and told me he had already, having been informed of my arrival, sent me a complimentary ticket to the exhibition to the care of the American minister, Mr. Adams.

It was, of course, gratifying to know that my visit had been anticipated, and that I should have every possible facility of attending and studying so extensive and magnificent a display of the stock and products of Great Britain as the Royal Society would naturally make in the great capital of the kingdom. The next step was to the American minister's. From Berkeley Square to Portland Place is not far, and I'll walk. Walking is the truly democratic style of locomotion, and the chief objection to it is that it takes time, and in a great strange city it is very poor economy when there is any thing important to do.

I soon found myself armed not only with my invitation to the Cattle Show, but with tickets to Windsor Castle, Woolwich Dock-yards, Hampton Court Palace, and other prominent places, and felt at once that I had something to do and that the best way would be to set myself about it. "Stand not upon the order of your going, but go." Starting off like the man with a full conviction that something was to be done—"a big thing"—and that he was the man to do it, it was not long before the eye rested upon a mysterious placard posted round the streets, in very big letters, beginning with the very pertinent query, "How are your poor feet?" That's the question. Struck suddenly with an idea of the importance of self-examination, it occurred to me that a "one horse shay," called here a "Hansom," of which there are always plenty in the streets of London, would be more conducive to reflection than a walk interrupted by the attractions of so many shop-windows. The fare in these Hansoms is sixpence a mile. The seat of the driver is on top at the back, so that he is above and behind the occupant inside. They are made to bear upon the shafts to such an extent that I could never ride in them with any comfort, as I always felt as if it must be painful to the poor horse.

The reason I heard given for it was that it prevented the wear and tear of the animal's feet upon the pavements.

Battersea Park lies on the Thames, well up opposite that part of the town called Chelsea, three or four miles above London Bridge. It will be borne in mind that London has grown to such dimensions as to take in many large towns which were formerly its suburbs. One can walk or ride, it is said, fourteen miles in any direction and still be in thickly-settled streets, between blocks of dingy brick. My quarters had been taken up, rather from necessity, than convenience, in Euston Square, down towards the city proper. When I first arrived in London every hotel was crowded to the utmost. The International Exhibition had, of course, brought strangers from abroad in great numbers; the Royal Cattle Show had brought up hundreds of others who were especially interested in that, and the grand Handel Festival, of which there were to be three performances this week, had brought together thousands more. Large and spacious as this great metropolis is, its hotels were for once completely filled.

The best way to reach Battersea Park I soon found to be by boat from the pier at Hungerford Market. A few minutes find me waiting for that easy mode of conveyance. A crowd of people line the pier; a crowd load down the narrow, sharp-built boat; but we shoot up the river, dodging around among the numerous other craft, under bridges, stopping often to let off and take on new crowds. Like a Yankee omnibus, the boat is never full.

The approach to the grounds was decidedly beautiful. The spacious park was not all occupied by the society's inclosure, and acres of shrubbery, walks and lawns surrounded the fences. The gates to the show-ground are self-registering. No one can enter without the inevitable click that is to tell the story of his passage. A good idea. No one can go out at the gate he enters. It is a genuine revolver, but turns only one way.

Once inside the grounds, the first thing is to buy a catalogue. That is another idea. "Catalogues for sale," in large letters over a little booth. Have a catalogue? Of course. Price one shilling. I found the catalogue of the stock entries made a volume of 160 pages, octavo, while that of the various agricultural implements and machines, a separate volume, filled 340 pages. I learned after the show was over, that the sale of catalogues amounted to $5,250. It was larger than had ever been known, and before the show ended the supply was exhausted, and people tried in vain to procure copies.

Here, then, was a day's work before me, with the "cream" of the best herds of England and Scotland, and a large delegation from abroad, all gathered together at one central point most conveniently arranged for examination.

The live stock catalogue contained 1,986 entries. Of these, 183 were foreign, comprising many choice animals from France, Switzerland, Holland, and Germany, and 238 Scotch, including the best breeds of the north—the Ayrshire, the West Highlanders, the polled Angus, the Clydesdales, and the Cheviots. The number of exhibitors of live stock was 535, and when it is considered that some single entries included several animals as among the sheep and swine, one may form some idea of the space occupied. The aggregate number of animals was 2,372. A casual glance through the yards impressed me with wonder, as it did every one else. Cattle, horses, sheep and swine were literally to be seen by the acre.

Those who attended the State Fair in Boston, in 1857, will recollect that the grounds included fifty acres or more, and the stalls for cattle and horses, extended round on all sides except the space occupied by the range of seats on the west, or Harrison Avenue side, and that all the stalls were filled, and very many had to be kept outside the grounds for want of accommodations. And yet the whole number of entries of live stock was only about 650, or less than a third part of those at this grand show.

Most of the stalls were filled. The weather was, for the most part, very mild and fine, or there would have been much difficulty in keeping so large a collection together ten days, under canvas. The sheds were simple structures, wide enough for two rows of animals tied head to head, the whole extending in straight lines across the park, with sufficient space between for the public. Animals of the same class or breed were put together; that is, the Shorthorns by themselves, the Herefords by themselves, &c.

My first step was to get a general idea of the whole arrangement. I intended to spend more or less of every day in the exhibition during its continuance, and the proper way to begin, it seemed to me, would be to walk through all parts of the ground, getting a clear general idea of what there was to be seen. This would take about a full day. Then I could devote the subsequent days to the study of such particular parts as struck me as being most worthy of it.

The first day of the general show was to be occupied by the judges in passing upon the various classes of stock. But the public had been admitted to the Implement yard on Monday and Tuesday, the judges' day for the stock having been fixed on Wednesday. Hitherto the public had not been admitted on the judges' day, except, of course, members of the society and invited guests. But this year, for the first time, the doors were open to outsiders, on the payment of a sovereign, or five dollars, the high price being designed to keep out the crowd, and give the judges ample facilities. Eleven hundred and forty-six paid the sovereign and entered, and appeared to regard it as a privilege to get in at any price on the judges' day, when the convenience of moving about was so much greater than on the shilling days, with their crowd. Here is another idea. A distinction in the prices on different days, giving those who choose to pay for the privilege an opportunity to see to better advantage. The same is adopted in the International Exhibition.

The only place for the judges to operate was between the rows of sheds. The ring, which is so much more convenient, as it separates the judges from interference on the part of the spectators, was dispensed with here on account of want of space to spare for that purpose. The amount of prizes offered for stock was $21,675, together with eight gold and thirty-two silver medals. No less than $9,440 was offered for horned cattle, of which an equal amount, $1,500, was intended for each, Shorthorns, Herefords and Devons, and $400 each for the Sussex, Long-horned, Norfolk and Suffolk polled, North Wales and South Wales, and $525 for the Channel Islands cattle, $1,170 for the Scotch polled, $585 for the Highlanders, and $660 for the Ayrshires.

In an English show one expects to find the Shorthorns leading in point of numbers. It is the fashionable breed. All the science and practical knowledge of the most distinguished breeders have been bestowed upon it, and exhausted in its improvement. It has a history such as no other breed has, and the English have a great regard for pedigree.

It is not surprising, therefore, that the entries of Shorthorns numbered 250, consisting of 138 bulls and 112 cows, while the Herefords rose to 97, a most splendid lot, and the Devons formed what they call a "juicy red line" of 66. It should be stated that this year, for the first time, the Highland and Agricultural Society of Scotland united its forces with the Royal Agricultural Society, and so the Scotch formed a component part of the English show here, and the *polled Aberdeen* and *Angus* formed a class of this grand show, as well as the *polled Galloways*, the *Highlanders*, and the *Ayrshires*. Scotland also sent in the *Black-faced* and the *Cheviot* sheep, and the Clydesdale horses. The Highland shepherds wore the plaid and kilt, and the Scotch dairymaids in attendance upon some of the herds gave a sort of picturesque effect to the classes from the north.

This being a sort of international year, the foreign stock also appeared in considerable numbers, and attracted its full share of interest and patronage. It was evident that the comparative want of feeding qualities would be likely to tell against them among a people obliged to breed for beef, but they exhibited in strongly marked contrast what the English breeder has long ceased to cultivate, milking qualities. The sweet-toned bell of polished metal which every Swiss cow wore, as if in conscious pride, upon her neck, and the beautiful *ranz des vaches* of the Swiss herdsmen, with their unique mountain costume, formed a pleasing and attractive feature of this great show. Some of them played the Alpine horn for the entertainment of the visitors.

The show of Shorthorns was more extensive, and, as a whole, by far the finest I had ever seen. That is, there was a larger number of animals of very high excellence than any I had seen together. I think I have seen as good individual animals in Kentucky as any I saw at the Royal Exhibition. The entries occupied 24 pages of the catalogue. As a whole they gave little or no indication of any attempt to breed for milk. That does not appear to be any part of the object of Shorthorn breeders, as a general rule. There may be exceptions, as among the Duchesse breeders, but few of these were here exhibited.

Many of the animals were too fat even for beef. I am inclined to think there was very just fault found on account of over-feeding animals in preparation for the show. The object of the society is declared to be to promote "a cheapened production of the best meat," and not to award prizes to animals best fattened for the butcher. And yet exhibitors understand very well that the fattest animals show off best, and, other things being equal, usually take the first prizes. I know that many expressed surprise that the owners of such splendid and high bred creatures, as many of the Shorthorns, Herefords and Devons, should run the risk of permanent injury for the sake of winning an uncertain prize. "Fat," they say, "will cover faults," and few judges are capable of discriminating between the comparative merits of points covered with fat and beauty.

The classes were arranged according to age, as "Bulls calved on or before July 1st, 1859, above three and under six years;" "Bulls calved since July 1st, 1859, above two and under three years;" and "Bulls calved since July 1st, 1860, above one and under, two years." Then "Bull calves above six and under twelve months old." And so "Cows above three years old," "Heifers in milk and in calf, under three years," and "Yearling heifers;" "Heifer calves above six and under twelve months old." Three prizes were offered in each class of males, $150, $75 and $25; and for the older females, $125, $50 and $25.

In the first class of bulls twenty-six animals were exhibited, a superb lot. Many of them were of great size, and magnificent in form and style. The first prize was given to a white and exceedingly fat bull, though many good judges thought the second prize had finer points for a breeding animal, and would have stood first had he been as well covered with fat as the first.

Twenty-five entries made up the second class, two years and under three, some of the animals being very superior. The first prize in this class was one of the best of this breed I ever saw. It would be difficult to find a more perfect model of a Shorthorn, either in form, richness of color, or fineness and quality of points. He was of a beautiful roan, but his nose was slightly tinged with the same color. He was from Scotland, as was also the third prize bull. It would be tedious to go through all the classes in detail, specifying with any minuteness the merits or the demerits of each. It is enough to state that the gold medal was given to a calf only ten months and two weeks old, an animal that had not attained maturity. He was a first-rate specimen to be sure, but as fat calves change very much in form and other qualities in coming two and three, there is no certainty that he would make any show even for the first prize, which is considered far less desirable than the gold medal, another year.

Mr. Jonas Webb, a breeder well known in this country, was an exhibitor in class V. He had on the ground five splendid cows, but though among the very finest specimens of the breed, he received only a third prize. Most of the best Shorthorn herds of Great Britain were represented at Battersea, and there never was a larger entry. The Shorthorns bore off no less than fifteen hundred dollars, and two gold medals.

The Herefords exhibited very great similarity both of form and color. They were without exception of a rich red, with the face, top of the neck, throat and portions of the under parts of the body, and the tip of the tail, white. They had branching horns, straight backs and full eyes, and a barrel round, cylindrical and exceedingly well formed for the objects for which they are bred.

The Hereford breeders turned out in larger numbers than they had ever done before. Many of the prize-takers were from the celebrated Cronkhill herd which was scattered a few years ago at Lord Berwick's sale. Eight prizes and several commendations fell to individuals bred at Cronkhill, or descendants from that herd, and I could not help regretting that the superb animals once owned by this State, which came from the same herd, had been removed beyond the reach of our farmers. I am satisfied that there are certain portions of the State where the Hereford would prove to be a profitable acquisition. These animals are correctly represented in the Fifth Report of the Board, 1857. They were sold to go to Maryland, for some five or six hundred dollars more than they had cost the State, and for breeding purposes were really worth that much more.

Two only of the first prizes went to the county of Hereford. One was taken by a splendid bull from the Flemish Farm, one of the Royal Farms at Windsor.

The cows in this class were called the best lot of Herefords ever exhibited, together, and it is no wonder that this breed is fast gaining favor even in competition with the lordly Shorthorns.

The Devons are confined more particularly to the western counties of England. They differ in their properties. Those in the north of Devonshire are the most beautiful, those in the south are said to be better for the dairy, while the varieties of Devons kept in Somerset are claimed to be better than either for the grazier. We have so many specimens of the breed that it is not necessary to particularize. Their symmetrical proportions, their compactness, their color, the fine texture of their flesh and their hardihood of constitution are points well known with us. The same wonderful uniformity that distinguished the beautiful line of Herefords, marked also these elegant, silky-coated Devons. As a class they demonstrate what can be done by careful breeding to remove those parts of the animal frame which are of least value and replace them with others which furnish the most valuable food.

The three prize bulls in class I. were from the Quartly stock, sons of Quartly's "Napoleon." And a yearling, also first prize, was sired by the same animal. He was sent from the royal herd at the Norfolk Farm, at Windsor Park, as was, also, the first prize bull calf. The South Devon farmers rarely exhibit their stock, confining their attention more strictly to the dairy, and the specimens of the breed so well known with us are from North Devon.

It has been significantly remarked that the Herefords and Devons furnish the "cuts" for the moneyed men, the Shorthorns, for the million. If that is so, I am confident my lot fell among the latter, as I cannot recollect that I had a really fine and tender beefsteak in all England, while I am sure that quite the opposite was the general character of the "cuts."

Of the Long-horns but few entries were made. The breeds above mentioned are the leading breeds of England, the ones which are more generally diffused. Others have a local reputation and characteristics which adapt them to the locations where they have become known. The Long-horns were a class extremely interesting to me, however, since I had known them chiefly by reputation. Who has not heard of the breed to the improvement of which the genius of Bakewell was directed with such marked success?

The Long-horns are found principally in the midland counties, particularly in Leicestershire and Warwickshire, but they have decreased in numbers since Bakewell left them, and are giving way to the more popular Shorthorns. They are very large in size, but, compared with their size, rather light in the carcass. The head is fine, the horns small, though long and branching, the back straight, the quarters wide and well developed. Nothing can exceed the quiet and docility of these good feeders. Formerly the milking qualities of this breed were in great estimation, but I do not know what their reputation is in this respect at the present time. It matters little, perhaps, as they will not be very widely known in competition with their successful rivals.

The same is true, I had supposed, to some extent, with the Norfolk and Suffolk polled cattle. Their reputation has been of a local character, principally. But they came up in greater force this year, with twenty-seven entries. They are supposed to owe their origin to the polled Galloways brought to Norfolk and Suffolk for grazing purposes, something like a century ago, the change in color being due either to crosses with the natives or to selections and climate.

It is stated that there are at the present time more than sixty herds of pure breds in the county of Norfolk. One of the successful exhibitors, Lord Sondes, has eighty head of them. The cows are reputed to be great milkers, giving, when in full flow, twenty-four quarts a day, while the steers, at three years old, weigh from seven to eight hundred pounds. As a class they are popular with the butchers.

The Welsh cattle did not turn out in great numbers. The few that were shown were chiefly interesting to me as curiosities. I had read much but seen little of them till this lot fell under my notice. There were specimens from North Wales and South.

The Irish Kerries turned out no more strongly. They came from the district of Munster. The specimens on the ground were very fine and uniform, some of them called good representatives of that useful little animal for mountain farms. They brought high prices.

The Jerseys were also in limited numbers, and not of the highest order. I have seen much better representatives of this class here. The show of this class of animals was by no means to be compared with that of the State Board at Boston in 1857. The Channel Islands are four in number. Jersey and Guernsey are the largest, the former being about twelve miles long by six wide, and containing thirty thousand acres, the latter nearly circular, about thirty miles in circumference. Alderney is only eight miles in circumference, and Sark but five miles long and three broad. All of them are famous for their dairy cows. The Guernsey and Sark cattle belong to the same family. The Jersey cow is smaller than the Guernsey, and rather finer in quality. There was a marked difference in the animals exhibited from the two islands, though the general appearance was similar. The Guernseys are sold lower in price than the Jerseys. Good Guernsey cows can be had for from $70 to $90, while the Jerseys range from $75 to $100, and for superior animals from $100 to $200.

The polled Aberdeen and Angus classes formed a very attractive part of the show. They are glossy black, with soft, delicate skins, exceedingly good handlers, stout carcasses and short legs. No doubt they are a hardy and profitable race. The number of entries was twenty-seven, and they formed one of the most interesting lots in the yard.

The first prize cow had always taken the highest honors wherever shown. She won a fifty guineas cup in 1860. The first prize yearling bull was a son of hers, as was also the second prize two-year-old. The second prize cow of the same owner won the fifty guineas cup at Aberdeen in 1861. They were unquestionably the best of the breed ever exhibited.

The owner of these animals has taken at international exhibitions and local shows over two hundred and fifty prizes, seventeen gold medals and forty silver ones, two gold medals in France, four cups, and also the Prince consort's cup at Poissy, at the great French exhibition, valued at $500, for the best ox of any breed, native or foreign. The Emperor Napoleon paid him $1,375 for a cow and heifer, at the great Paris show of 1856. The breed has been known in Scotland from time immemorial.

The polled Galloways are not very numerous. Like the preceding, they are also black. They have long been favorites with the English graziers. I saw some hundreds of both these races in my subsequent rambles through the lowlands and the highlands of Scotland.

The West Highlanders were not shown in very strong force. I saw these also in far greater numbers on their native heaths in the West Highlands, and upon the Hebrides Islands, which I visited in August and September. They did not do themselves justice at the show.

But the Ayrshires made a magnificent display. The qualities and character of this most valuable breed of dairy animals are too well known to need recapitulation here. We have now among us as good specimens as could be found at the show, with one or two exceptions perhaps as good as could be found in Scotland. They were divided into seven classes, three for bulls, one for cows in milk, one for cows in calf, one for heifers under three, and one for heifers under two years. The number of entries was fifty-six.

Another interesting feature of the show was to be found in the foreign stock department. Here were the favorites, the flowers of the flocks from the polders of Holland, the plains of Normandy, and the steep, green, mountain slopes of Alpine Switzerland. For the purposes of the English breeder they could not be compared with either of the prominent breeds noticed above, the Shorthorns, the Herefords or the Devons. These breeds are immensely superior. It was not to be expected, of course, that in numbers the foreign exhibitors would come up to the English. The difficulties of transportation were too great, especially for the inland countries. But, no doubt, the selections were made with great care. Indeed, as I afterwards saw all the foreign breeds exhibited upon their native soil, I am sure they were among the best representatives of their various classes. They were the best of their kind. It was fortunate, therefore, that they had premiums offered in separate classes. Both the English cattle and the English sheep show more careful attention to breeding. Still as dairy stock they made an exceedingly creditable show of themselves, and attracted about them a crowd of admiring spectators.

The little Bretonne cows pleased me exceedingly. Standing only about three feet high on their legs—the most fashionable height—most, black and white, now and then but rarely, a red and white, they are docile as kittens, and look pretty enough to become the kitchen pet of the hard pressed mountain or hillside farmer, with pastures too short and scanty for a grosser animal. Ten pounds of hay will suffice for their limited wants for twenty-four hours, and they would evidently fill a seven-quart pail as quick and long as any other cow. In fact the Bretons took my fancy, and had it been practicable I should have liked nothing better than to have taken them along, as one would take a favorite dog. The cost of keep could hardly have been greater.

These pretty Bretons will often hold out in milk, so the herdsmen said, from fifteen to eighteen months after calving, and often begin after the first calf with six or seven quarts a day. The horn is fine, not unlike the Jersey's, but smaller, and tapering off gradually, and the escutcheon, or milk marks of Guènon, generally very good. Good cows are held at from sixty to seventy dollars a head, a fancy price of course, but I am not sure that they would not pay six per cent. on the investment as well as most "fancy stocks."

The horses at this great show were very different from those which would be expected at a similar show in New England. In some respects we could have far surpassed the exhibition at Battersea Park, grand as it was. Perhaps not, however, in the eyes of an Englishman.

The most striking, and to me the most interesting feature in the horse yard was the grand array of Suffolks. Those entered as agricultural horses not qualified to compete as Suffolks, and the Clydesdales were scarcely less remarkable. One of the most judicious reporters, in speaking of the show of horses at this exhibition, admits that "the short-comings of particular parts were immensely outweighed by the completeness and perfection of the whole," and that "the grand array of agricultural horses, consisting as they did of three great divisions, the Suffolks, the Clydesdales, and the miscellaneous breeds, were sufficient in themselves to wrest the laurels from every previous show, and materially conduced to the prevailing impression, that the Battersea Show of 1862 stands out in bold relief as the most successful in the annals of the society."

Two prizes were offered for Thoroughbreds—the first of $500, the second of $125. They called out but thirteen entries. The first was won by the Derby winner six years ago. It was amusing to see the interest awakened by this class, small as it was, among the gentlemen of the turf. I could not see why nearly five times as much should be offered and awarded for the best Thoroughbred as for the best pure bred Shorthorn, or the best pure bred Hereford.

If the design had been to select the best Thoroughbred as a getter of hunters, a class of horses possessing many useful practical qualities, it would have seemed more in keeping with the objects of the society. But the judges were expressly directed to award the prize to the horse best calculated to get stout racers. The prize therefore went to a perfect greyhound, though a large-headed one. He was long and low, with good shoulders, and good fore legs. No doubt he could run well; he couldn't otherwise have won the Derby. I do not pretend to be a judge of Thoroughbred horses; but after examining all the horses in that class, it struck me that some of the less fortunate competitors would serve their country better in the way of getting good hunters than "Ellington," who bore off the $500,—for, judging from what I saw of the hunters in those entered in that class in the show, and subsequently in Warwickshire, where I rode, like Tam O'Shanter, over ditches and fences, a powerful hunting Rosinante, wholly unable to curb his young energies, it seemed to me to require a horse deep in the ribs, powerful in the chest, strong legs and flat feet, good shoulders and quarters, good in the loins and hocks, to get that most desirable class of horses.

In the class of Hunters there were but seven entries. They consisted both of Thoroughbreds and half-breds, but both the prizes were borne off by half-breds. The first prize animal, *British Statesman*, was a beautiful dark bay of five years, of great symmetry of form, strong in the limbs, said to be three-quarters Thoroughbred.

The Suffolks attracted great attention. They have undergone considerable changes in the course of improvements in breeding. The punchy character has been bred out of them, and they have become horses of much greater size and style. They derive their name from the county in which they are most extensively bred, and are not very common in other parts of England. They show very considerable uniformity of color and general form. They are said to be capital farm horses, but not equal for heavy loads to the common dray, the Clydesdale, or what is called here the agricultural horse. Some of these horses at the exhibition were loaded down with fat.

The carriage horse is usually a cross with Thoroughbred and Cleveland Bay. Those shown at Battersea Park were not remarkable, though a few were decidedly showy horses. The competition in this class was not large.

In Roadsters the exhibition was scarcely equal to a county fair in New England. Indeed many a county fair with us far surpasses in this class.

The dray horses made a magnificent turn out, though it would be difficult to see the advantage of making so many distinct classes. They differ little from those in the class of agricultural horses, and in fact it is no uncommon thing for a horse to take a premium as a dray horse one year, or at one show, and as an agricultural horse at the next. The immense dray horses often seen in the brewers' teams are too slow, and they will soon give place to horses of less size and greater activity.

The Clydesdales formed an extremely interesting part of the show, especially in the class of stallions. The first prize horse in this class, without question the best cart horse stallion in the show, cost $2,500, so the groom said. It was reported that the horse which received the commendation of the judges sold for the same sum. The Clydesdales are noted for their fine style and action, and for great strength and nimbleness of motion; they are said, also, to have remarkably good legs and feet. The first prize horse above alluded to was a very large and powerful stallion, exceedingly strong in the hind quarters and yet full of life and spirit. It is the kind of horse that we need here for getting farm and stylish carriage horses, and some one would do the public a service by importing a few good specimens, especially if we could avoid the failings sometimes imputed to these horses of being badly ribbed up, or short in the rib, having lightness of body in proportion to length of legs, or as we say, "too much daylight" under them. A horse of this make will require large supplies of food to keep him in condition when at work, or he will soon run down. But the first prize stallion was remarkably free from these faults, and it would be difficult to find, I think, a better stock-getter for the purposes alluded to. I am not aware that many good specimens of this breed have ever been imported into this country. The best Clydesdales are found in Ayrshire, Lanark, Renfrew, Stirling and Dumbarton.

Of the sheep it would be difficult to say too much as a whole, though in some classes they were deficient in the numbers shown, and some said, in quality, as compared with some former exhibitions. The number of entries was 641.

The Cotswolds were admitted to be the most magnificent lot ever shown. They formed one of the leading and most attractive features of the show. There were ninety entries. The first prize ram, the judges said, was "the best they ever saw," and the old sheep generally in the Cotswold classes "were never larger or better as a lot." Many of them showed a sprinkling of gray. One of the second prizes was much tinctured with this, which was regarded generally as a defect. They excel most other breeds in a combination of weight of carcass, wool and quality. The prominent points of those at the fair were the broad, straight back, fine neck and shoulders, and great length of quarter. They all had the *large foretop on the forehead*, which is considered to be a strong characteristic of the Cotswold breed. As an instance of the prices which this popular breed brings in England, it may be mentioned that in 1861, thirty-five rams sold at an average of over $172 each.

The Leicesters were also numerous, showing no less than sixty-six rams. This is a sheep, as is well known in this country, first brought into notice in 1790, by Mr. Bakewell. At his suggestion the principal breeders formed a mutual admiration club, and resolved, "that strict secrecy be kept by all members;"

that "no member should let a ram at fairs or markets;" that "no member should give his rams artificial food;" that "no ram be let to members of the Lincolnshire Society in classes at less than two hundred guineas;" that "no member sell any ewes, except to kill, at less than ten guineas each." No less than fifty-seven breeders signed this agreement. In 1793 there was a sale of two hundred ewes, which brought from sixteen to sixty-two guineas. The whole brought 2,600 guineas, or $13,000.

Hitherto Bakewell's flock has been kept together, and so kept pure. It has now been scattered to considerable extent by public sale since the exhibition. The Leicesters are so well known that it is not necessary to dwell upon them. Their symmetrical proportions, and their extraordinary mutton-producing qualities, are familiar to every farmer.

Of the Lincolns but a few were exhibited. They have rather a local or county reputation. As I afterwards spent considerable time in Lincolnshire, I saw better specimens, it seemed to me, than were shown at Battersea Park.

Then came the Romney Marsh, another local breed kept in large numbers in a cold bleak district of some 25,000 acres, along the south-east coast. They are preserved for their hardihood.

The Southdowns made a fine display, with ninety-six entries! It is an old and well established breed. The Goodwood flock, or that of the Duke of Richmond, numbering two thousand, in addition to one thousand lambs bred annually, dates back a hundred years. This is no doubt one of the most profitable mutton sheep in existence. It is hardy, easily kept and docile, and the mutton is very highly prized.

Mr. Jonas Webb, whom I had the good fortune to meet on the ground, and whose lamented death was announced only a few weeks since, has been largely engaged for many years in improving and perfecting this celebrated breed. He was well known in this country, not only as a breeder of Shorthorns, in which he gained a high reputation, but as identified with the Southdowns.

His flock was disposed of in June last. The lot of rams, numbering 148, brought over $14,059, or an average of $95 apiece, while the ewes, 289 in number, brought over $14,542, making a total of $28,602. This was only the clearing out of the flock. The first portion of it, which was sold last year, 1861, comprising 967 animals, brought over $54,631, so that the whole flock of 1,404 realized the owner more than $83,193.

When the small cost of raising sheep, where the dogs are licensed, or taken care of according to law, is considered, the profits to the breeder would seem to be satisfactory. Is it not time, not only for the farmer, but for the officers of towns whose duty it is to enforce the sheep law with us, to consider how much we are losing annually by keeping dogs instead of sheep, and how much the whole community suffers in consequence of the dog risks in sheep raising, which deter so many from this profitable and interesting branch of farming? It is certainly for the interest of towns to be liberal to those who keep sheep and suffer loss from dogs. Let them enforce the law to the very letter, and then, if those who embark in this enterprise lose a valuable animal, let them not quibble about the proof that a dog caused the loss, if there is any reasonable ground to suppose he did, but show the farmers that they have ample protection under the law, and in less than five years we shall see our flocks multiplied.

The Shropshires were shown in considerable numbers, there being upwards of ninety entries, and so were the Hampshire Downs. Both these breeds have undergone very great improvements of late years. I am not aware that specimens of either of them have been imported to any extent into this country.

I took more interest in the Oxfordshire Downs, a new breed, now recognized by the Royal Agricultural Society as such, started or brought to notice about the year 1833. It was originated by a cross between the Cotswold ram and the Hampshire Down ewe, and with careful attention the characteristics of the progeny soon became fixed to such an extent as to compel their recognition as a distinct breed.

More than sixty entries, presenting a long array of well-filled pens, certainly went far to show that there was some foundation for the claim of the breeders of this class, that they had produced a real "wool and mutton" sheep which was up to the demands of the age. The different flocks were not quite so uniform throughout, in size and form, as I should have expected to find them Some of them had much darker faces and legs, with a finer staple, than others, indicating a closer alliance with the Hampshire Downs. Some of them were larger than others, and a larger size seems to be the tendency of breeders at the present time. They shear on an average from seven to nine pounds, and weigh at sixteen months from twenty to twenty-four pounds to the quarter.

The Dorsets came next. They are a short-woolled sheep, having a local rather than a general reputation. They are an old and well established breed.

The class of mountain sheep brought together a great variety, some in wool and some without, some large and some small, some with horns and some without. There were Exmoors from Somerset, Sarks from Yorkshire, Cheviots from Wales, and many others.

The Blackfaced sheep of Scotland attracted their full share of attention. They are wonderfully hardy and well adapted to the bleak Highlands where they have to rough it in all weathers. I saw them upon the highest hill-tops in the north of Scotland, where scarcely any other sheep would subsist, browsing among the heather. They have long, large horns, mottled faces and legs, sharp, wild-looking eyes, long bodies, and long coarse wool, shearing rarely over four or five pounds. They are not usually fed till four or five years old, but then produce sweet juicy mutton. If they had a better fleece they would be one of the best of breeds for rough mountain pastures that could be found. They were all shown in their wool.

The Cheviots also formed a most interesting feature of the show. They came from the hills on the border, from Cumberland, Northumberland, Berwick and Dumfries. They are hornless, have white legs and faces, with long bodies and necks, fleeces of middling length, weighing from four to six pounds. They are not much known in the southern counties, but for the country where they range are a most useful and no doubt a very profitable animal. All the classes were very well represented, and this breed went off with flying colors.

The entries of Merinos were all confined to the foreign department. Those from Saxony appeared to take the lead in perfection and fineness of wool, but the French Merinos turned out in by far the largest numbers. As fine wool producers, nothing could compare with these classes, and as an evidence of the high estimation in which they were held, it may be stated that a French Merino ram sold, to go to Pomerania, for 100 guineas, or $500, and three Saxons for 600 guineas, or $3,000, to go to Australia. Of these, one, a Saxon ram, brought $2,000.

The number of "sleeping beauties" in the pig-pens was two hundred and forty-five, sent in by one hundred and ninety-three exhibitors. Many of the breeds showed a wonderful tendency to fatten. The old standard rule of "keeping a pig warm, filling him with food and sending him to sleep," was strictly practiced in these styes. Walking, indeed, was out of the question. I believe there were some which could not open their eyes, from very fatness. I should have liked to see them "trotted out." I do not think the exhibitors entertain an exalted idea of working their swine in the manure-heap. The contrast between these sleek and lazy English porkers and the lank subsoilers we saw tied along the streets of Naples, looking for all the world as if they could outrun most of the horses on a clear track, was worthy of making "a note on."

The classification, as with us, was into "large breeds," "small white," "small black," "Berkshires," and "any other breed." Which of these classes most satisfactorily answered the all-important question, "Will a pig pay?" I am not able to say.

The large breeds appeared to me among the most profitable. One old "Golden Dream" had a girth of six feet six inches. She had produced one hundred and fifty-three pigs, in thirteen litters. Yorkshire seemed to be partial to white breeds, Suffolk to the black. The Berkshires made a good show. Most if not all the swine were evidently fed and pampered for show. They were not in every day, working order. Indeed, this was pretty universally the case in all the classes of live animals, except the dairy stock, and many animals there had eaten more in the few months previous to the show than they had turned into milk.

It was universally admitted, I believe, that the exhibition of implements and machinery had never been surpassed, never equalled even, by the society. Every house and every manufacturer seemed to have determined to do its best, and this exhibition was, no doubt, the most complete representation of the agricultural mechanics of Great Britain at the present time. To give some idea of its extent and magnificence, it is sufficient to state that the number of exhibitors in this particular department was two hundred and seventy-three, and that there were no less than five thousand and ninety-four entries; that the money-value on the priced entries alone was $422,640; and that the total value of the goods exhibited was about half a million of dollars. One exhibitor had on the ground implements worth $24,550.

No premiums were offered. None were required to bring out this magnificent show. In my enthusiasm, on the first day of entering the grounds, I bought an implement-catalogue, as a preliminary step, but the size of it was such as to be not a little burdensome, especially as it was necessary to transport it back and forth night and morning.

In this vast mass of entries it is impossible, of course, to particularize at any length.

The general impression created on the mind of an American, after looking somewhat carefully through the yard, would be that great strength and durability formed the most prominent characteristic of all English agricultural implements. They appear to be made as if the farmer were able to keep a strong team, and had nothing else to do with it but work these heavy tools. No allowance is made for the probability of producing any thing better, so that the farmer might want to change. Under similar circumstances, I am sure the English plough does no better work, ordinarily, than the American, while it requires a far stronger team; and so with most other implements. They are what would be called clumsy by a New England farmer. I speak, of course, generally. There are, no doubt, exceptions, as there are to all general rules. I stepped into a large and well-filled stall of forks, rakes, &c., the smaller implements. Close alongside was a large exhibition of American forks, not got up for the exhibition, but sent in by a house that sells American farming implements on commission. The comparison, of course, was easy, as they were both together, alongside, under an open shed. We asked the very intelligent attendant of the stall of English implements whether he thought his forks equal to the others. "No," he said; "for some reason or other our manufacturers not only cannot make a fork equal to the American, but they cannot imitate the American. They saw your forks here, by the side of ours, in 1851, admitted their immense superiority, and have been trying ever since to equal them in lightness, united with sufficient strength and flexibility; but, though they have vastly improved ours, they cannot yet compare with yours." The difference was so marked that one could tell blindfolded which was the most desirable to use. The tines of the American fork were not only strong, but very flexible. They could be bent nearly double without breaking. Besides, they were light, and far better finished than the English. Our implements, as a whole, may not be quite so durable, but they are durable enough. What is the use in adding to them a pound of extra timber or iron? Who would use a plough made twenty years ago, even supposing it to be in running order?

But there are some things that we ought to have. Among them may be mentioned the good tile-making machines. Why should good draining tiles be so high with us, when equally good ones are produced in Europe at a quarter part of the cost to the farmer? I saw a machine worked by one man making tiles at the rate of ten thousand a day. The machine cost $140. Others making bricks at the rate of twenty and thirty thousand a day. I do not know how these latter machines compare with ours in the amount of work they perform. Then, too, many of the lawn mowers were very useful implements. In threshing, mowing and reaping machines, horse-rakes, hand-rakes, hoes, &c., it strikes me we are, on the whole, decidedly in advance of the English manufacturers. But in steam cultivation, which formed a prominent part of the show, they have done more than we.

During the exhibition, a trial of steam ploughs and steam cultivators took place in Kent, and I was there to see. Most of the land selected for the trial was light, and some of it was shallow.

Several machines had already steamed up ready for action, on our arrival; among them Fowler's, with a large fourteen horse-power engine, with clip-drum and rope, a four-furrow plough, and a balance cultivator of seven tines. Both did good work, the plough making about an acre and a half an hour, and the cultivator about three acres. It was evidently deeper work than the land had ever before received, but that was not saying much. The depth of the cultivation in the neighborhood was nothing to brag of. These ploughs went not far from seven inches, and did good work.

Fowler had an arrangement for working a common eight horse-power threshing engine in steam cultivation, by a travelling anchor which pulled it along, carrying also a clip-drum, by which the plough or cultivator is drawn to and fro.

Howard had a ten horse-power engine, which operated a stationary windlass, and drew a four-tined cultivator and plough to and fro, doing very good work. He also had a balance plough.

In another part of the field a three-tined grubber was at work. Here the soil was heavier. It did very good work.

There was also another engine fitted with a double vertical windlass, and a simple mode of steadying the rope in winding and unwinding, and to give and reverse the motion of the windlass. It required great length of rope running loopwise to the extreme end of the lot, and passing round a single pully fastened to a snatch-block. It works two cultivators at once, one from the snatch-block to the middle, the other from that point towards the engine. The rope must of course be strong and heavy, and subject to considerable wear.

As to the rate at which these steam ploughs and cultivators worked, it may be stated that Howard's ten horse-power, with a pressure of seventy pounds of steam, drawing three mould-boards, and taking about two and a half feet in breadth, and six or seven inches deep, ploughed at the rate of seven and one-half acres a day, of ten hours. Another double cylinder engine of the same power, working a grubber of three tines, took about three feet of land, or at the rate of a dozen acres a day. Fowler's ten horse-power engine, single cylinder, taking four furrows, or about three and one-quarter feet breadth, seven and one-half inches deep, worked at the rate of an acre an hour, or perhaps twelve acres a day. The ploughing was well done, as well as the work of the double Michigan plough. Fowler also had a double cylinder fourteen horse-power engine, with clip-drum under the boiler, drawing four mould-boards, seven or eight inches deep, at the rate of nine and one-quarter acres a day, of ten hours.

Steam ploughing for New England, for the present, at least, is out of the question. If it be economical at all for this country, it must be under peculiar circumstances upon some of the large estates of the West, where it is a great object to get on with such work at a particular season, and where sufficient force cannot be had to work in the ordinary way. That is, where time is a great object with less regard to expense.

I made very minute inquiries of the men at work with the engines upon the field, as to the cost of running the machine, wear and tear, fuel, &c., for the purpose of comparison with our slower modes, and I could not resist the conclusion that the cost was quite as great, or would be for us, where labor is more expensive.

It stands about as follows: The original cost of the machine is from $1,500 to $2,000. But that may be partially left out of the account, because it may be used for many other purposes on a large farm, as well as the seven or eight horses which the same money could buy. But there is the wear and tear of ropes and machinery, no small item, and the consumption of fuel, several hundred pounds a day. It takes eight men and one boy to work the machine, also a horse and cart to bring fuel and water. Under ordinary circumstances, with the necessity of stopping to change positions, or for repairs, it is not to be supposed that any of the steam ploughs we saw at work could average over eight acres a day, at the most. In my opinion, four men, with each a good span of horses, and a good American plough, would do equally good and as much work in a day as those machines, and the cost would be somewhere in the neighborhood of ten or twelve dollars. The average cost per acre by the machine is over two dollars, probably nearly two and one-quarter dollars.

No doubt great improvements will be made, and the machines be simplified so as to require less men in attendance. But if the facts I obtained on the spot are to be relied upon, I cannot, for the present, see the economy of steam cultivation, except in peculiar and exceptional cases.

And so this great agricultural fête, to which all the world was invited, has drawn to a close. It is admitted to be, take it all in all, the grandest and most complete exhibition ever made by the Royal Society, which is, perhaps, as much as to say it was the grandest ever held in the world. In some particulars, preceding shows have surpassed it, it is said by those who have always attended them, but as a whole, when the extent and relative merits of the stock are considered, the extent, value and efficiency of the agricultural implements and the attraction added to it by the exhibition of foreign stock of such variety and high quality, it surpasses by far in interest and importance any of its predecessors.

Strange to say, that in the great city of London, at a time when an unusual number of strangers were flocking thither, with weather as fine as London weather ever is, the receipts fell short of the expenditures to the extent of about $15,000. The whole cost amounted to about $75,000. The aggregate receipts amounted to only about $60,000. Some of the items of cost were as follows. The show yard cost $22,500. Of this the horse stalls cost about twenty dollars apiece. The prizes for stock and the medals awarded amounted to $20,000. The forage and straw bill amounted to $10,000. The society had to pay about $3,000 for the use of land for steam ploughing. It seemed to us to be an enormous bill. The cost of police was about $3,000, and so on. It is a pretty large sum to stand on the wrong side of the society's books, but the farmers of England are rich. The exhibition afforded them one of the finest markets in the world, which for the great stock breeders and implement makers is a matter of so much importance that the loss of a few thousand dollars to the society is a matter of very little consequence. As an instance of the great opportunity such exhibitions give both to farmers and the manufacturers of agricultural implements, it may be stated that Fowler, the implement maker, sold steam cultivating machinery to the amount of $70,000, at this show, while the Howards, equally noted, sold some fourteen or fifteen machines which must have amounted to nearly as much more. Many sheep and other animals were sold at enormous prices, some to go to Australia, and others to other parts of the world.

And now for a walk about London. Think of a population of three millions! Many a kingdom on the continent contains no more. The British colonies of America at the time of the revolution had but about "three millions of people armed in the holy cause of liberty." The State of Massachusetts in 1850 contained a total of less than one million, and in 1860 but a little over. And yet here are three millions crowded into a single city, large in extent, to be sure, but still, London, with its great mass of moving life, its striking contrasts of wealth and splendor with the most abject and heart-rending poverty. Here is a map. The stranger constantly needs it. The Thames, only about thirty or forty rods wide here, divides the city into north and south. It is spanned by a dozen bridges, the lowest of which is London Bridge, the most noted of all; most of these are on stone piers and arches, two are of iron, and some two or three are wire suspensions. The larger part of the population is north of the river.

As we look over the city the eye rests with satisfaction upon the many and frequent open squares and parks, adorned with trees and shrubbery, interspersed with lawns and flowers, statuary or other works of art, and lakes for waterfowl. There is Hyde Park, with its three hundred and eighty acres, in the very heart of the town, Regent's Park, with its three hundred and seventy-two acres, adorned with magnificent gardens, and a zoölogical museum unrivalled for its excellence and public utility; connected with it are terraces and canals, occupying eighty acres more. Here is Green Park, of fifty-six acres, connected with St. James' Park, of eighty-seven acres. Nothing can exceed St. James' Park for elegance or finished taste. Its plan is perfect, and its variety and beauty a model of landscape gardening. It is grazed by large flocks of sheep, which add to its attractions an air of the green lawns of the country, while the royal and lordly mansions which look down upon it lend a charm which no similar spot of ground anywhere else can boast. There is Buckingham Palace, the residence of the queen, and many a mansion around which clusters a long series of historical associations.

But St. James' is in itself the most appropriately and elegantly laid out of any park I ever saw. Without any of the stiffness of our straight walks and rows of trees standing in rank and file, the lines of beauty are preserved in graceful curves, while the endless arrangement of shrubbery in clumps, groups of trees and parterres of flowers, ponds for aquatic plants and waterfowl, pleases the eye.

There, too, are Kensington Gardens, of two hundred and twenty-seven acres, to say nothing of private open grounds within its enclosures. Battersea Park, of one hundred and seventy-five acres, where the herds of England come up to show their points under the direction of the Royal Agricultural Society. These are only a few of the noble parks. There are many more, either within or in the immediate vicinity of this Great city, as Victoria Park, of two hundred and forty-eight acres, Richmond Park, &c. I suppose that more than two thousand acres are taken up with parks and open squares fenced in, and adorned with shrubbery and flowers, in the very heart of London.

We may mount to the dome of St. Paul's, which is in the older part of the town, or in the city of London proper, and see at our feet a greater aggregate of wealth accumulated in a smaller space than from any other point on the face of the globe. And we need not look far either. A single mile around St. Paul's includes the Bank of England and the offices of the wealthiest bankers, merchants and business men, the representatives of untold millions. Farther than this we could hardly expect to look. A thick smoke or fog almost invariably hangs over the great metropolis. The sun is seldom seen, or if at all only dimly, as through a smoky glass. How could it be otherwise where more than three millions of tons of bituminous coal are consumed in a year, or on an average more than eight thousand tons a day throughout the year? But the inhabitants are so accustomed to it that they think little of it. It is fortunate for them, perhaps, that they know so little of any other. Not far off is Smithfield market—Smithfield so famous in the annals of the Reformation. Step into it on a market day and we shall find where the meat comes from that feeds so many mouths.

These are evidently brought from the continent. They are Dutch and were fattened at the distilleries in Holland. In the first six months of 1862 London received six thousand one hundred and ninety-five head of cattle from the continent. But that is below the average. During the first six months of 1861 she received twelve thousand four hundred and twenty-two. The drain from there in 1860 and 1861 was so great that live stock and dead meat are now very dear in Holland, and as prices have lately ruled rather low in London on account of the large numbers sent from Scotland and Ireland, which, in prosperous years, find a market at Manchester and Leeds, in Lancashire, that the importation from the continent is small.

The cattle coming into market this year, too, are said to be of excellent quality, both the crosses and the pure breeds.

The consumption of London, always enormous, is, of course, largely increased this year by the thousands of strangers attending the International Exhibition. This would have sent prices up, had it not been for the distress among the cotton manufacturing districts.

Here are some Irish cattle. A part of them, about one-third, show evident signs of crosses with the Shorthorns, Devons or Herefords. This lot is "fairish to middling," but it is said that notwithstanding the crosses, their weight will fall considerably below the average of years. Ireland has sent into London in six months two thousand five hundred and forty-five head.

Those are from Scotland. She has sent in nine thousand seven hundred and ninety-four head in the first six months of this year. Four thousand of these were crosses and about five thousand pure breeds, the former in magnificent condition on account of the great abundance of grass and the great quantity of hay cut last year.

From Leicestershire, Lincolnshire and Northampton, about fifteen hundred Shorthorns have been received in the same six months, and it is said the farmers are holding on to large quantities on account of the abundance of food and the comparatively low prices.

But there is a curious lot from Spain. This numbers five hundred head, large and well formed, but it is said they "cut up badly," with a small quantity of fat inside. They bring but from $100 to $130 a head, a small inducement to send any more of the same sort, for, taking out commissions, freight, &c., there cannot be much left.

Among the sheep, many come from Holland, but it is said they do not equal those brought from there in 1860 and 1861. The prices rule lower than for the well fed English sheep. The best Downs are bringing about fifteen cents a pound. The wool clip this year, in England, Ireland and Scotland, is said to have been the largest and best on record. There are enormous quantities of wool from the colonies, nearly a hundred thousand bales, now on hand. The production and profit on lambs, this season, is the largest ever known. The trade has been active, the prices good. The best Down breeds have brought usually over twenty-five cents a pound, but the lambs received from abroad, about three thousand six hundred in number, have come in poor condition, and the prices have been low. Over seven thousand calves came in from the continent also, and only about twelve hundred were supplied by England.

So that the number of animals sold in London in the first six months of 1862, was 116,735. The number of cows 3,054; the number of sheep and lambs 631,672; the number of calves 8,259; the number of pigs 17,407.

But wherever we go the stranger is filled with amazement at the vastness of every thing around him. The city itself is a constant wonder, and if there were nothing else of interest, magnitude alone would arrest the attention as the grand characteristic of London, and it forces itself upon the mind everywhere, in the streets, crowded always with moving life, in the shops, endless in their number and variety, in the public places of amusement, in the churches, in the evidences of rapid increase of this already multitudinous population. Large as it already is one can hardly resist the conclusion that it is still increasing as fast as some of our own western cities.

Then the impression of vast accumulations of wealth which has made England so powerful, is no less overwhelming. In London the signs of wealth are seen everywhere, in hundreds of streets and squares. Palace after palace in endless succession meets the eye, and splendid residences might be taken as one of the leading features of this immense population. The shops of Regent Street and Piccadilly make little show in comparison with the indefinite number of splendid private residences. Portman Square, Belgrade, Bloomsbury and Grosvenor Squares, Soho, and Portland Place, are only a few of the localities remarkable for luxurious dwellings, but their names are as familiar as Fleet Street, the Strand, Cornhill, St. Paul's Churchyard, Pater Noster Row, and Grub Street. I was more than once lost in the intricate by-ways where I knew I was close by Fleet Street, and the more I tried to get out the deeper I got entangled.

I always longed to visit Westminster Abbey, St. Paul's, the British Museum, and other spots woven into a long chapter of historical associations, but it is surprising to find that the interest attaching to particular parts, in themselves so interesting, when contemplated from a distance, gives way to the impression of wonder at the magnitude of the whole, when you seem to lose all individuality and to be swallowed up in the limitless crowd in which you mingle. It is as good as a play or an opera to stand and watch the ever varying multitudes of the Strand, the Haymarket, or Fleet Street. It is a constant stream, rush, torrent of human life, and you are caught up and borne along by it.

I spent a day in Westminster Abbey, and attended the gorgeous service there, trying to imbibe the spirit of the place and appreciate the fact in all its significance, that more than six hundred years have passed away since Henry the Third raised its gray walls, its clustered shafts and pointed arches, which still rise to heaven in graceful lightness, strength and beauty; but the thought of the outward world, the grandeur and magnificence of size, would have its influence even there.

The sculptured monuments and tombs without number fill the mind with awe, as any churchyard would, but after visiting those of Rome and Florence, and other Italian cities, they sink into insignificance in comparison, so far as their artistic merit is concerned, while but very few contain the names of any body that we know or care any thing about. In the poets' corner, to be sure, one would like to linger long, but even there the number of those whose names are familiar to us is small, and the feeling that only a very few of those whose names are inscribed on the marble were actually buried there, inclines one to pass on to the shrine of Edward the Confessor, the chapel of Henry the Seventh, or the Jerusalem Chamber.

A long line of kings and queens lies buried within these walls, and the stranger pauses to recall what he has read of them, what they did for the good or the harm of mankind. The shrine of Edward the Confessor is the most ancient and interesting of the monuments of the past. Here is also the old Scone stone, on which the ancient kings of Scotland were crowned, now fixed into a coronation chair, made by order of Edward the First, and there the headless statue of Edward the Fifth, from which the solid silver head was stolen long ago.

Just across the street are the Houses of Parliament, in the most elaborate and profuse Gothic style, which appears, to use the expression of a noble lady, decidedly "jimcracky." I had the good fortune to see these buildings by day and to examine them at my leisure, and soon after to attend the sitting of the House of Lords, where I heard Lord John Russell, the Earl of Derby, Lord Brougham, and many others whose names are more or less familiar to all Americans. Space will not allow me to state my impressions of these men or their speeches, nor of those I had the good fortune to hear in the House of Commons, to which I had access through the kindness of Mr. Cobden, whom I had previously met in this country, and to whom I had letters. I presented both him and Mr. John Bright with copies of the beautiful edition of "Harris on Insects Injurious to Vegetation," on behalf of the State of Massachusetts, for the kindly words they had spoken for my country. Here also I had the pleasure of hearing Lord Palmerston, Mr. D'Israeli, Mr. Cobden, and many others.

The British Museum is a little world of itself. I visited it many times, and always came away in despair of ever obtaining an adequate idea of it myself, and it would be useless to attempt to convey any just conception of its immense extent, or the extreme riches and splendor of its collections. The Egyptian remains form a most wonderful and interesting feature, and they throw greater and clearer light on the history and domestic economy of that most remarkable people, the ancient Egyptians, than any other collection in the world, but these remains form only a small part of the whole. Every department is planned upon the grandest scale, and filled with all that science, art and boundless wealth could command. It is a compendium, an epitome, the most complete imaginable of the history, the manners and customs of all nations and all times, of all arts and all sciences. This vast and varied establishment, supported and endowed by the government, is open free to the people, and must exert a vast and powerful influence upon the education and development of the masses. It is very naturally a subject of laudable national pride, an institution worthy to be adopted as a model by every civilized nation.

The Thames tunnel is remarkable rather as a curiosity than any thing else. Whatever may have been its original design, it is certainly of very little practical value, so far as I could judge. I went through it as any one would go to see a show. As a triumph of engineering one may admire its complete success.

The Tower of London is visited with very different feelings. How many associations of the past those gloomy walls awaken! There is the dark cell where Sir Walter Raleigh was fifteen years confined; there the block, and the axe that severed the head from the body of the unfortunate Lady Jane Grey, at the command of the cruel Mary; there the spot, the tower green, that has flowed with the blood of many an innocent victim, many a martyr to the cause of truth and justice, and many a guilt-stained criminal; there the priceless crown jewels of England, the crown, the mace, and other trappings of royalty; there is the bloody tower, and there are the stairs beneath which were found the bones of those two innocent young victims of the ambition of Richard the Third; there the knights in armor, on horseback, the real ancient armor just as it was worn in many a fierce, personal and warlike conflict. What is there not there to remind one of the cruel, dark and barbarous ages in the history of our ancestors? The Tower is a place to be visited once. One does not want to see it again. It leaves a feeling of pain and sadness, and a sensation of relief succeeds when one is fairly out.

Close by is Tower Hill, the spot where so many illustrious victims suffered death at the hands of the executioner. The Mint is also near, and so are the celebrated London Docks, the most extensive perhaps of any in the world. All this part of the city, in fact, is old and more or less associated with all English history, from the times of the Romans down to our own. Some monument of the past strikes the eye wherever we turn, and it is not difficult to summon up in parade before the mind, the actors in the scenes of which these streets, these old time-worn walls were witnesses years ago, long before our fathers left them to seek a more congenial home in the West.

Just behind Buckingham Palace, to return again to the West End, are the queen's "mews" or stables, to which I had access after the unwinding of considerable "red tape." The number of horses at the time of my visit was about a hundred, consisting of saddle and coach horses mostly. Many that are usually kept there had been taken to Osborne, in the Isle of Wight, where the queen was spending the summer. The stalls are wide and airy, and every thing was neat and attractive. They evidently expected company. The harness-room was shown us, and the different harnesses for special occasions. One stable was filled with cream-colored entire horses, used only on state occasions, when the queen goes to open or prorogue parliament. They are Hanoverians, bred for this special purpose, as the groom told us, and the only ones in the kingdom.

Her majesty's state coach was also shown us, as the great wonder of the place. An old man has the charge of it, and makes a charge for showing it, sixpence, I believe. It was built by order of George the Third, and finished in 1761. The superb paintings which adorn the doors and panels were by Cypriani. The whole of the carriage and body is richly ornamented with laurel and carved work, beautifully gilt. The length is twenty-four feet, width eight feet three inches, height twelve feet, length of pole twelve feet four inches, and weight four tons. The old man was careful to impress us with the fact that it cost about twenty-five thousand dollars.

A fine riding school is also connected with the stables, where the children are taught, almost as soon as they are able to sit upright, our attendant said, by experienced riding masters. A series of hurdles are used to teach the art of leaping fences, &c. Though visitors are requested not to fee the servants, our attendant looked so longingly for the usual shilling that we could hardly refuse, and he pocketed his money with evident delight. I never knew an Englishman, under any circumstances, to refuse money for any little trifling service for which a Yankee would feel insulted, or at least hurt, by the offer of compensation. Every one expects it, and is angry, or appears to be, if it is not offered. The love of money is the universal weakness of the people, and it sticks out a thousand times more prominently and offensively than it does among the people of any part of America that I have ever visited. It is a cant and stereotyped phrase of the times, particularly among Englishmen, that the Yankees love the "almighty dollar;" but no one can travel over England, and meet with every class of society, without coming to the conclusion that the people of that country love the "almighty guinea" a great deal more than five times as much as the American loves the dollar. I am by no means alone in this conviction. It is the universal impression upon the continent, so far as I could judge, and the universal experience, so far as I could learn, of strangers in England. One can scarcely turn round, either in London or any other part of England, without having to pay sixpence, at least; and if he can preserve his temper at the manifest and absurd injustice of many of the charges at hotels, he must be a model of forbearance, and of the other Christian virtues.

I lost no time of course in visiting the grand exhibition of the industry of all nations. It stands in close proximity to Hyde Park, but more properly in Kensington Gardens. The outside of the structure is by no means imposing, having none of the architectural effect or the graceful proportions of the beautiful Crystal Palace of 1851, now preserved at Sydenham, twelve miles from the heart of London. Like every thing else here, it is grand in magnitude, and size alone has its effect.

As we enter, a world of beauty strikes the eye in the thousands of every nation and every tongue that crowd the light and airy structure, in the gracefully arranged fountains, the innumerable cases of rich and splendid productions of art, genius and industry. After spending half a day in constant circulation through the endless naves, galleries, annexes and courts of various nations, my sensations were those of complete bewilderment. Think of sixty or seventy thousand people collected under one great roof of glass, all eager to see, and others constantly coming. Think of hundreds of "courts," all full of the choicest specimens of the industry of almost as many different nations, some of them of the most gorgeous description imaginable. Think of one vast annex, where the machinery of every conceivable kind is in motion, filling the air with its buzzing and whirling, its clanking and thundering roar mingling in a grand harmony of confusion. I am indebted to Prof. J. W. Hoyt, of Madison, Wis., who had spent weeks there, for his guidance in my first visit to the exhibition.

It was only after going again and again, and spending several days there, that I could get a clear and definite idea of the whole, and carry off any thing that would be of value hereafter.

There is scarcely a single department of this great World's Fair that would not require many pages, if I should attempt to convey any adequate idea of it to the mind of a reader who had never seen it. I might speak at some length of the Kohinoor diamond, the crown jewels and royal jems displayed; of the endless display of elegant and costly laces and furs, silks and satins; works of art, both of painting and statuary, filling long and lofty galleries, but I should despair of giving any complete idea of the whole. I shall therefore confine myself mainly to the Department allotted to the United States.

It will be remembered, that in the Exhibition of 1851, the United States made so meagre a show that the English journals at first affected to despise the American court, and made it the object of many a sneer, but that before its close, when the great practical value of the articles and implements presented became better known and tested, the tone was changed to one of appreciation at least, if not of admiration at the grand success of that department. No doubt that display was of great advantage to the American mechanic, and it was desirable to maintain the prestige of success in 1862.

The affairs of the country, well known all the world over, offered a sufficient and satisfactory reason for the refusal of the government to appropriate money for the transportation of the products of American industry to London. The show on the part of the United States was therefore much more limited than it otherwise would have been. The space allotted to this country was in one corner of the building, about a hundred feet long by sixty wide, but more than a quarter of a mile from the annex which contained the machinery in motion, which was in another corner. This was the only space the Commissioners had to give us, though it was far from being adequate to the display of all the objects forwarded, and a large number of articles had to remain in their original packages unopened, for want of room to be placed, while a good many machines of value were wholly excluded on account of a want of compliance with the regulations on the part of those who wished to exhibit them.

Of agricultural implements the number was few, to be sure, but they were generally admitted to be of a highly creditable character. Five patterns of reapers and mowers, included

Wood's self-raking reaper, combined reaper and mower, and grass-cutting machine; Russell & Tremain's reaping machine—a new mechanical invention; Kirby & Osborne's reaper and mower; Redstone's mowing and reaping machine, and McCormick's reaper. The last ranks first in the estimation of those who crowded around, though whether justly or more from its high reputation, it is not for me to say. It was splendidly got up, without regard to cost, and its former success no doubt increased the interest manifested in it by the public. It was put to the test of trial in the neighborhood of the city, and sustained its high reputation so well that the "Mark Lane Express" spoke of it as follows: "McCormick, of Chicago, Ill., has laid the world under new obligations. No one can pretend to be insensible to the economic benefits which have been conferred upon the farmers of this country by the introduction of the reaping machine, which was the wonder of the Exhibition of 1851. It has played an important part in the salvation of our harvests, when otherwise they must have suffered to considerable extent on account of the westward movement of our population. It was in fact the first machine in England which settled the question, in the farmer's eyes, between the mechanical and the manual process of corn cutting. When we say that from the Brentwood Works so many as three thousand reapers have already been supplied to the farmers of the United Kingdom, and capable of cutting down from twelve to fifteen acres a day; that hundreds of men are laying low the golden harvests, and saving the fruit of man's toils in the fields of France, Russia, Spain, Germany, Italy and Belgium; and that, further, the inventor, within the last twenty years, has supplied forty thousand machines to secure the grain crops of the world's corn-field of America, some slight idea will be gained of the benefits which may be conferred on his fellow men by one persevering thinker. The machine of 1851 has enabled us to look the arduousness of the harvest in the face with comparative nonchalance; but the machine to which we are about to revert, and which occupies a place in the present International Exhibition, promises yet further to simplify the work of the harvest field."

Other journals were quite as cordial in their encomiums of this and other American machines, and even the unscrupulous, anti-American "London Times" is decidedly warm in its praise, and owns up that in "shearing corn" the United States are still ahead. It even went so far as to say, that "after the models and gigantic engines in the western annex, the *very ingenious, small, hand-labor saving machines in the American court are the most looked after.* * * This is worthy of a more extended notice than it has yet received from the mass of visitors." Alluding to a large number of American machines, such as sewing machines, cork cutters, rope makers, washing machines, &c., the same paper speaks of them as "*almost approaching the inspirations of genius in the simple means by which their great results are effected.*"

American rotating harrows were also on exhibition, and steel ploughs; but though the American ploughs fully and fairly beat the English on their own ground in 1851, it is not probable that on this important implement they will acknowledge themselves surpassed. But the hoes, forks and rakes are so manifestly superior, that even the old fogy English farmer, who thought at first that they would do to hang up in the Exhibition, and were not fit for practical work on the field, has begun to give in, and no doubt the demand will increase as they become better known. I venture the assertion that no good New England farmer would use the English implements of this class if he could have them furnished for nothing.

The Douglas Axe Company made a highly creditable show of American axes and cutlery, of various sorts. I do not know how they compare with the English implements of the same kind, but they are infinitely ahead of any thing and every thing of the kind I saw on the continent.

"Where's that Yankee milking machine?" got to be a very common question, and the exhibitor always had a crowd about him. He rented a cow over opposite the establishment, and practiced pumping her every day at eleven o'clock, to show off the practicability of the machine. It is a tin bucket covered tight, half the cover moving upon hinges, and four pliant India rubber bags, into which the teats are placed, when the tubes and valves are worked by two lever handles projecting perpendicularly towards the milker, who sits down in the usual posture, with the machine between his knees, puts the teats in their places, and pumps away.

Many other specimens of American ingenuity were shown, among them a good flax and fibre dressing machine, exhibited by a firm in New York city; a spacing and boring machine, a self-registering dynamometer, a duplex steam-pump, a stationary engine and governors, a stone-breaking machine, a rope and cord machine, a gas regulator, and an "iron refrigerator," by G. H. Sanborn, of Boston; a belt-shifter, by J. C. Gove, of Jamaica Plain. The California pump, of very ingenious design, attracted a good deal of attention, and the general impression was that it was a "good idea." Ross's conical burr-stone mills attracted much notice, and got a medal. Ericsson's hot air engines were also on exhibition.

A steam fire engine, from Lee & Larned, of New York, was compact, light, easily worked, and received a medal for ingenuity of design and good workmanship. A newspaper addressing machine, entered by Mr. S. Sweet, of New York, also received a medal. Signal telegraphs were also exhibited. A regular Yankee machine for making shoes was sent from Boston, said to be capable of sewing a pair of shoes, all ready to the finisher's hand, in twenty minutes! It worked to a charm, and seemed to "astonish the natives."

Wilcox and Gibb's sewing machines took the lead, in my opinion, of the many patterns on exhibition, and it is hardly necessary to say that they attracted about them an admiring crowd. This machine is a single stitch, very simple in contrivance, easily understood and kept in order, and, what is often of considerable importance, runs without the noise which most other machines produce. This class of machines may almost be said to be peculiarly *American*, for the American machines take the lead all over Europe, and have invariably borne off the prizes over the European. No invention of modern times is regarded with more interest by the *better portion* of mankind.

A thousand specimens of American minerals were exhibited in the department of mining, quarrying, metallurgy and mineral products, and made a highly interesting and creditable show. Small cabinets of Lake Superior copper and minerals, the zinc ores of the extensive mines of the New Jersey Company, and cases of gold, silver, quicksilver ores, and native sulphur and borax, were also exhibited.

The loom for weaving tufted or pile fabrics of every description was, no doubt, one of the most valuable of all the grand inventions of the exhibition. The London "Mechanics' Magazine" says, in its notice of it: "Among the many useful inventions from the United States, perhaps the most remarkable is the power loom for weaving tufted fabrics. This is the invention of Mr. A. Smith, of West Farms, New York, and intended for weaving the Axminster carpets, and any other tufted or pile fabric which requires cutting and is produced from a pattern. Unlike either the Jacquard or the old draw loom, the pattern designed is formed by the arrangement of the spools, which are suspended over the machine to the number of two hundred and seventy. These produce a pattern the whole width of the material and one and a half yards long, and at every throw of the shuttle a piece of mechanism rises up like so many fingers, catches hold of the threads and weaves them in. A knife then passes swiftly over it, and cuts off the tufts to any length required. Any design can be woven in it in parts, which, when united, will have the appearance of being woven in one piece, and the loom will produce twenty-five yards in a day. This loom has received great attention from scientific Englishmen, and Earl Granville, who is well acquainted with weaving operations, has declared publicly that it is destined to achieve great results."

What Earl Granville really said was, that this American loom was "perhaps the most useful invention produced within the past several years—itself an honor to America, if she had had nothing else at the exhibition." The certainty and ease with which the machine seized the right threads at the right time, and worked them into place and cut them off, leaving the tufted surface even, with the pattern beautifully produced, was the subject of marvel to thousands who saw this "new Yankee wonder."

Of pianos, those of Steinway and Sons, of New York city, of course, took the lead, and received the medal for "powerful, clear, and brilliant tone and excellence of workmanship"; and so much pleased were some of the members of the committee, themselves skilful musicians from Germany and France, and considered among the best judges of musical instruments in the world, that they declared the Steinway pianos "not only the best on exhibition, but the best they had ever seen." As I had bought a Steinway only a few months before, it was gratifying to have my judgment of it so emphatically confirmed.

Of the works of art exhibited by Americans, though not numerous, it may be said that they were creditable in the highest degree to the country. The quality and high character of the paintings, photographs and engravings were not surpassed by any other nation, and, in the opinion of many disinterested judges, they were not equalled; and if Church had been there with his "Heart of the Andes" and his "Niagara," I have little doubt that they would have attracted more attention than any other works of the kind.

Space will not permit me to dwell longer upon this department, but I cannot omit to mention that the master-pieces of sculpture were those of our own citizen, W. W. Story. Though exhibited in the Roman court, they are no less American. His "Cleopatra" cannot fail to add largely to his already brilliant reputation as an artist. This faultless and exquisitely beautiful statue is of pure white marble. Nothing can exceed the chasteness and simplicity of the design. She sits a queen, the elbow of the right arm resting on the back of the chair, the head leaning upon her hand. The drapery clothes the whole body except the splendid neck, the exquisitely rounded arms and one sandled foot. The expression is full of thought, as if a shade of sadness weighed upon the heart. Story's "Sybilla Libica" is also a splendid work of art, in faultless marble, and attracted very great attention. Both works were disposed of to Englishmen, at very great prices.

During my stay in London I made an excursion to Tiptree Hall Farm, in Essex. This farm is well known by reputation in this country, as that of Mr. Alderman Mechi, of London. It is forty-four miles from the city. It consisted originally of one hundred and thirty, afterwards increased to one hundred and seventy acres, of heath almost barren, which by extraordinary labor and expense has been converted into a very productive, highly cultivated and beautiful farm, thoroughly under-drained and furnished with the means of applying the manure in a liquid form, from a central cistern through pipes laid underground, radiating to various parts of the farm, through which the manure is forced by steam-power.

More than ninety miles of drain tiles have been laid, at distances of four yards apart, and from thirty-two inches to five feet deep. The soil is stiff and retentive, with a loamy subsoil, and without draining not very productive. The depth of the more recently laid drains is much greater than those laid when the operations were begun twenty years ago, experience having taught that the deep drains, often five or six feet, are the most effective. But Mr. Mechi thinks that ordinarily in strong tenacious soils four or five feet is enough, the distance between the drains being about thirty-three feet. In making a five feet drain the opening at the top is but eighteen inches, thus saving the labor of digging any unnecessary amount of earth. The pipe most frequently used is one inch bore, that being sufficient to remove the water under any ordinary circumstances. For every three hundred yards of drain he thinks there should be a leader or main drain, and an open ditch for every seven or eight acres.

Mr. Mechi believes in thin sowing, after his lands are properly drained and prepared. He sows but one bushel of wheat per acre, but then thin sown wheat requires weeding, which is done with a horse machine. All his wheat crops are drilled in, which makes it very easy to weed and stir the soil often. The wheat, when I was there, was as stout and good as I ever saw, and the foreman said he should get sixty bushels per acre on one or two of the lots, and from fifty-six to sixty on all. For barley he sows from six to eight pecks, and for oats two bushels per acre.

I could not help observing that every thing about the premises looked as if designed for use and profit, rather than for show. Nothing, or very little, appeared as if designed for mere fancy. There was an air of work about the whole which was hardly to be expected on an English farm. Steam is made to do a great variety of things, and I had an opportunity of seeing the processes of grinding grain, cutting and pulping roots, sawing, &c., while all the threshing, the irrigation, and many other operations are carried on by means of steam-power.

Among the growing crops were large fields of beans, and I noticed that this formed an important, almost a staple crop in many parts of England. This crop ought, probably, to be much more generally cultivated and fed to stock by us than it is, for it is excellent, especially as a feed for sheep. By raising beans and fattening sheep and other stock he makes a vast quantity of manure, which is after all the great thing for every farm. The cattle stand in pens on open floors, through which all the liquid manure runs off into the tank, and a jet of water from a hose finely divides the solid droppings and sends them off in the same way. So that the manure which is used is rather liquified than liquid, that is, it includes all excrementitious matter, solid and liquid, made fluid by the large addition of water or by decomposition in water.

Before using the liquid manure accumulated in the tank, a powerful current of air or waste steam is forced through it a few hours, when the whole mass becomes thoroughly mixed up, when it may be easily forced through the pipes to every part of the farm. "By irrigation," Mechi says, "I am enabled to double, if not triple, my green and root crops, and thus render them profitable instead of unprofitable. It is quite clear that if I can double my stock, I also double the quantity of my manure, and thus effect importantly the cereal crops. If I double my green and root crops, I diminish their cost one-half." There are certain expenses that are incident to land, and which amount to about as much whether it produces large crops or small, such as taxes, fences, &c.

Many have been inclined to doubt whether, with the large expenditures in permanent improvements on this farm, the balance would, at the end of each year, be on the right side. The foreman assured me that the result was at least six or seven per cent. on the whole investment, and Mr. Mechi himself claims that it is still larger, I believe.

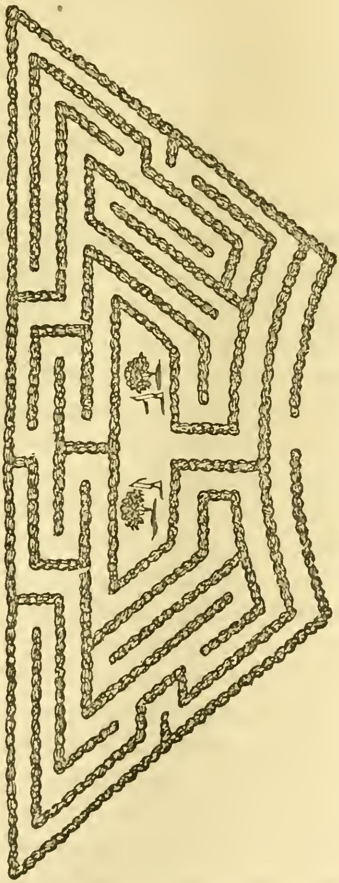
Space will not allow me to dwell at greater detail upon the many interesting points of this farm. A considerable portion of the land on the way from the station to the farm, a distance of three or four miles, I should think, was devoted to the raising of seeds, and was kept in the highest state of cultivation.

It is an interesting little trip to Hampton Court. Every-body goes to Hampton Court, the great palace of Cardinal Wolsey. If the historical associations were not inducement enough, the magnificent grounds and gardens laid out with so much skill and expense would be sufficient for any one interested in horticulture. This old palace stands on the left bank of the Thames, twelve miles out of London. It was occupied by

Henry VIII. His son, Edward VI., was born there. It was occupied by Queen Mary and Queen Elizabeth in turn, and at times by James I. Charles I. was imprisoned there. Charles II. and James II. also occupied it, and so did William III. and Queen Anne. George II. was the last sovereign who resided there. Without dwelling upon the numberless objects of art within the palace, which is full of the choicest paintings, it may be stated that the building itself occupies no less than eight acres, including the court in the centre, and that the walks in the gardens, wilderness and palace are about three miles in extent. The latter are laid out in the French style, then very popular not only in England but on the continent. The trees were trimmed by rule and measure, and the graceful forms of nature made to assume an artificial primness which does not please me. The same style was adopted and carried out at the Palace of Shönbrunn in Vienna, and at Versailles.

The lawns are closely and beautifully shaven by a small lawn mower, which does the work perfectly. I saw it often used in various parts of England, and am sure it might often be used here with advantage. It is drawn by one man, or may be by a horse, though there is an objection to the tramping of a heavy animal. The artificial lakes, surrounded by water-fowls, the park, with its large numbers of deer, the gardens of flowers and shrubbery, all add their charms to this lovely spot; but art appears here at every turn. Hollies and yews are formed into peacocks and other shapes of birds and animals. There are large orange trees in full bearing also. But the greatest curiosity is the great vine, a Hamburg grape, planted in 1768, and of course nearly a hundred years old, said to be the largest in Europe. It is covered by a glass shed seventy-two feet long by thirty wide. The vine enters the house at one corner, and is thirty-six inches in circumference at three feet from the ground. The length of the main branch is one hundred and ten feet; this, with another leading branch and their offshoots, covers a space of two thousand two hundred square feet. In 1861 this vine bore nine hundred pounds, not all cut off till February. When I was there it had on it one thousand three hundred clusters, large and fine. All the fruit goes to the royal family.

The floor of the vine house is of flat stone. About a third part of it consists of excavations or holes five or six inches square, and a yard apart, filled with sulphur to prevent mildew. The rays of the sun, it was said, cause it to act upon the vine. I often saw powdered sulphur sprinkled upon the leaves of the vine in Italy to prevent the disease which has been so fatal to the grape for seven years past, but this was the only place where I saw it used thus, that is, placed around the roots. As the house was completely filled by the vine trained overhead and down at the sides, the gardener was asked why it was not enlarged, to which he replied that "it was thought best not to let the vine bear any more than that would hold."



The Maze, at Hampton Court.

In another part of the grounds there is what is called the Maze, or Labyrinth, covering about a third of an acre, and so arranged that it would puzzle the most skilful engineer to find his way out. It is formed of growing beech cut down to six feet high and about a foot thick, trimmed up perfectly square on the sides and top. It was formed in the reign of King William III., and is still in perfect preservation. Men, women and children were trying to navigate their way in and out, and it was a source of no small amusement both to them and the lookers-on.

Windsor Castle is about twenty miles above London, on the banks of the Thames. It was built by William the Conqueror soon after he mounted the throne, and Edward the Third having been born there, and having a peculiar love for the place, erected a magnificent new palace, which still remains, the most complete and perfect and, in many respects, the most interesting specimen of a royal feudal castle of the middle ages to be found in Europe.

Situated on a beautiful elevation, it overlooks one of the most lovely and finished landscapes in all England. Looking down from the "castled keep," Eton College stands almost at your feet, and off beyond the town rises the graceful spire of Stoke Pogis Church, the spot which gave inspiration to the Poet Gray, whose "Elegy in a Country Churchyard" is the sweetest gem of the language; while a little to the left, in Stoke Park, is the seat of the Penns, whose name will be forever associated with the history of Pennsylvania, and near by which are the remains of an old house of Coke, one of the great lights of English law; while here at the right, a little, is Slough, where Sir William Herschel made his observations as an astronomer, with the great telescope, the largest ever constructed. The remains of this great man lie over there yonder in the old Norman Church at Upton. But here, in the opposite direction, down the river, is old Windsor, where the old Saxon and early Norman kings first fixed their seat, and there is Runnymede, where the proud barons wrung the Magna Charta from King John in 1215. Twelve counties can be seen from this lofty tower in a clear day.

Windsor Castle is the seat of Her Majesty the Queen, and of her ancestors clear back to the conquest. One cannot pass through its endless succession of halls and towers without the reflection that many of the brightest as well as the blackest pages of English history are connected with the spot. The houses of York and Lancaster struggled for its possession. Here were signed the decrees which lighted the fires of Smithfield. These walls have witnessed the extinction of royal houses, and in turn sheltered the great actors in the Commonwealth. Here Cromwell thundered away to all Europe against the persecution of men for their Protestantism. The names of warriors, statesmen, divines, poets, some of the brightest names as well as the blackest on the pages of history are forever connected with the annals of this castle. Many state prisoners were confined here.

As we arrive, the Audience Chamber is first entered. It is a gorgeous room, the ceiling painted by Verrio, representing the coronation of Esther and the triumph of Mordecai in Goberlin tapestry. There are portraits of Mary Queen of Scots, &c. Then comes the Presence Chamber, containing also subjects from Esther in tapestry, and on the ceiling, Catherine, the queen of Charles the Second. It contains much beautifully carved wood work by Gibbon. The Guard Chamber contains a great many interesting relics, such as the old armor of king John of France, taken at the battle of Poitiers, and David of Scotland, both imprisoned here in the reign of Edward the Third, Henry the Eighth's shield, and many others. St. George's Banqueting Hall is two hundred feet long, and thirty-four wide, with a Gothic ceiling, portraits of sovereigns, throne-chair and chair of state, innumerable escutcheons of knights, and many other objects of interest. Then come the Ball Room, the Throne Room, the Waterloo or Grand Dining Room, full of portraits of men who figured at Waterloo, the Grand Vestibule, the Grand Staircase, with Chantry's statue of George the Fourth, the State Ante-room, with Verrio's Banquet of the Gods in the ceiling, and Reynolds' George the Third.

Ruben's Room is full of the works of that great artist, mostly of the size of life. Here is also a chair made of the wood of auld kirk Alloway. The Council Chamber, the King's Cabinet, the Queen's Closet, with silver tables, George the Fourth's state bed, &c. Near this is the queen's Drawing-room, and the Vandyke Room, and many others. The queen's private apartments, and the room where Prince Albert died are pointed out by the attendants, but the public are not admitted.

St. George's Chapel, built by Edward Third, and rebuilt by George the Third, contains many monuments of interest. Henry the Sixth and Henry the Eighth are buried in vaults beneath. Edward the Fourth is also buried under a tomb of iron-work, and George the Third lies buried in the mausoleum at one end.

About five millions of dollars have been spent in repairs and restorations of the Castle during the last forty years.

After passing through the Castle, I availed myself of an invitation which had been procured for me by Lord Powis, to visit the farms and dairy-house of the late Prince Consort. These are the home farms which supply the Castle, but since 1849, when the prince became tenant of them, they were under his control. The intelligent foreman took pains to show us all parts of the buildings, the stock, the operation of the steam-engine used for threshing, grinding, cutting straw, roots,

&c. What is called the Shaw farm consists of eight hundred acres in Windsor Park, of which one hundred and twelve acres are arable. Six pairs of stout farm horses are kept to do the work, and about thirty men are employed constantly, and extra hands in haying and harvesting. The hours for work are from six o'clock to eleven, and from twelve to five. The horses are wholly Clydesdales. The Prince had frequently been an exhibitor of Clydesdales, and a successful competitor at the agricultural shows.

The manure used is that produced there. The whole is, of course, under high cultivation. The yield of mangel wurzel is commonly about forty tons per acre. As many as sixty tons per acre have been obtained. The wheat is put up in neatly-built round stacks in the yard, close by the shed which contains the steam-engine, and the roots are to go into a shed also close at hand, to be cut up by the same power.

The buildings are exceedingly well arranged upon a square plot of ground, the sides north and south, and east and west, respectively. There are two rows of sheds or barns along the two sides of the square, running north and south. In the row of buildings on the east side, besides wagon-sheds at the end, there is a lodging-house with a school-room in the middle. There are also open sheds with boxes for feeding farm horses on the same side.

The row on the western side includes a carpenter's shop well stocked with tools, threshing barn and granaries, the house for steam-engine and boiler, a floor for mixing chaff and pulped roots, piggeries ranged around three sides of a square, with tank for fermenting food, boiler and feeding troughs in the middle. On the east and west sides of the square, and between these two north and south lines are three rows of buildings with walks between them. The first row on the north includes the house of the foreman, a stable and poultry-house, blacksmith's shop, &c.

Another row contains boxes and feeding stalls facing south, including a large root-house, with a root-cutter worked by a shaft from a one-horse steam-engine, by steam brought under ground from the main steam-boiler in the threshing-room. A third row contains the sheep-feeding stalls. The sheep sheds are full in winter. The last winter they contained among others one hundred and fifty Cheviot wethers kept in pens nine feet square, and holding each a half-a-dozen. They are fed with chopped roots and oil-cake, and thrive well. It is estimated that a hundred horse-cartloads of solid manure is produced by them each winter. The place is kept sweet, clean, and well ventilated. The machinery, in addition to that named, consists of corn and cake crushers, chaff and turnip cutters, millstones, &c., all worked by steam. The granaries are on the floor over the threshing-room, and the grain is carried up by cups or sacks on bands, and delivered into the bins. A crane and pulleys facilitates loading into carts on the outside. Among the implements is Wood's combined reaper and mower.

The horses, when kept at pretty hard work, are allowed two bushels of grain per week, and often a daily feeding of beans in addition, with hay in full supply.

I was especially interested in the dairy establishment. This is a short distance across the fields from the farm already described. It is called Frogmore. The dairy-house was built under the direct supervision of the prince, and is the most superb of its kind that I ever examined. It was finished only about twelve months (so the dairy-maid informed us,) before the death of his Royal Highness. To call it beautiful does not begin to express it. It is splendid in all its parts. The milk-room is thirty-six feet by twenty, and about twenty feet high, the roof resting on pillars. The shelves all around are marble, and the tables in the middle "all marble." The pans and dishes are all porcelain, china, or glass. The floor, the walls, the ceilings, are all porcelain, the floor and roof in the form of tiles, the latter having openings for ventilation. The porcelain on the walls is white. In the cornicing and other ornamental parts it is embossed and colored. The whole is perfect in form, coloring and lustre. The pans were full of the richest milk covered with the yellowest coating of cream. The obliging maid gave us as much as we could drink. Around the walls, beautifully painted on china, were likenesses of all the royal family, the children represented in the midst of the quiet, beautiful scenes of country life. The name of each was placed beneath, I believe—as the "Princess Alice," &c. It is needless to say that every thing was kept with the most scrupulous neatness.

The dairy herd is kept quite near here. The herd at the farm first mentioned consists largely of Short-horns collected or bred chiefly since 1850. We saw some Brahmins there, and the herdsman who came with them. They were presented to the prince. The stock at the dairy farm consists of Short-horns, Short-horn grades and Jerseys—nearly two hundred head in all. The accommodations here are of the most perfect character, not only as respects drainage, watering, yarding, &c., but for feeding, and all the operations connected with the establishment. Water is brought in pipes to troughs which are on the same level throughout, and is constantly before and within reach of the stock. The cow-house is double-rowed, with a spacious gangway between, so that the rows of animals stand facing each other. The cows are tied by chain and ring sliding on an upright post. The drainage of the sheds and yards is carried to a manure-house from which the liquid may be pumped into carts, and applied directly or distributed upon the heaps of stall manure, which is protected from the weather. The litter used is mostly fern leaves mown in the park, and stored for winter use.

The arrangements for the pigs are here also most ample. The breed chiefly kept are the White Windsors. They are of medium size, and looked in fine condition. At the first farm mentioned they were the Berkshires. The steward gives the preference to the Windsors, on account of their early maturity and as being more prolific. The amount of sales from the piggeries has sometimes reached $3,500 a year.

The cows kept for the dairy are not allowed to have roots, but are fed chiefly on hay and pasturage, with plenty of water.

The prince had been a frequent exhibitor at agricultural shows, and twenty-seven silver medals, five gold medals and six cups, were shown in a case at the dairy-house.

The poultry-house and aviary were very neatly arranged buildings, near the dairy-house. The cages were wire-work, extending out from a long range of sheds, the different varieties being kept apart. A pretty little pond surrounded by geese and ducks added its charms to this lovely spot.

The remains of the prince have recently been deposited in a magnificent new mausoleum, in the park near by. That in which lies the body of the late Duchess of Kent, mother of the queen, is also close at hand.

The drive through Windsor Park is full of interest. Both the old plantations and very many of the individual trees are full of historical associations. Some of them date as far back as the reign of Henry the Eighth, some of them are connected with Queen Elizabeth and many subsequent sovereigns. Drains four feet deep and from twenty to thirty feet apart, extend over a considerable portion of the park. The ferns and rushes which till within a few years deformed this park, are now mown several times a year, and they soon die out under that treatment. Then the growth of the true grasses is encouraged by manuring, and when a plot is drained, a part of the soil is thrown out upon the grass, which also receives a liberal manuring of farm-yard compost and bone dust, the first year, when the grass is cut, and the next year or two fed short by Scotch cattle, which also receive four pounds of oil-cake a day each.

In going down what is called the Long Walk, from the castle, we passed between magnificent rows of elms planted in 1680, in the reign of Charles the Second. The avenue consists of double rows on either side of the carriage-way, the trees thirty feet apart, and the double rows one hundred feet apart. This avenue extends from the gate of the castle, in a line straight as an arrow, for two miles and a quarter, to Snow Hill, on the brow of which and directly fronting the castle, stands a fine equestrian statue of George the Third.

Near by are many old and magnificent trees that date back more than eight hundred years. There is the Conqueror's Oak, nine or ten centuries old, twenty-six feet in circumference and hollow. There are Queen Anne's, Queen Caroline's, Queen Charlotte's, Queen Adelaide's and Queen Victoria's trees. And here is Windsor forest. The whole extent of lands under the charge of the surveyor of forests is fourteen thousand acres, including forty miles of road.

Here, too, is the Flemish farm, another of the farms under the direction of the prince. It is chiefly remarkable for its magnificent herd of Herefords, numbering about ninety head of pure breds, including thirty-five or forty cows in milk, and a large number of calves, heifers, yearlings and two-year-olds.

This herd will doubtless compare favorably with any herd in the country for its purity and uniformity.

This farm consists of four hundred acres of land, half of which is arable. Beyond this is still another royal farm, known as the Norfolk Farm, of seven hundred acres, two hundred of which are arable. This is of a lighter soil and well adapted for raising roots. Artificial manure is applied here, including guano and super-phosphate. Here is a large herd of pure bred Devons, numbering about a hundred head. A large number of sheep are also kept here, and some sixty or seventy Berkshire pigs.

The average yield of wheat on the Shaw and Home Farms, has for some years been about forty-two bushels per acre, beans fifty-three bushels, oats eighty-six bushels, mangels forty-two tons, and Swedes fourteen tons.

From Windsor Park we drove to Stoke Pogis, four miles, through a level, rich and highly cultivated tract. Tall elms line the way and add an unspeakable charm to this quiet rural district. The church stands within the enclosure of the churchyard, so truthfully and so beautifully described in Gray's exquisite elegy. Though ninety years have passed since the poet lived and wrote, the scene would not appear to have changed, and if the elegy had been written but yesterday, it could not have given a more accurate picture. It was an hour or two before the setting sun. The green fields stretching away on a level, the soft stillness of the air, the sweet music of birds, the ivy-grown church, all concurred to remind us of the lines beginning—

> "The curfew tolls the knell of parting day,
> The lowing herd winds slowly o'er the lea,
> The ploughman homewards plods his weary way,
> And leaves the world to darkness and to me.
>
> "Now fades the glimmering landscape on the sight,
> And all the air a solemn stillness holds,
> Save where the beetle wheels his drony flight,
> Or drowsy tinklings lull the distant folds."

The yew trees deeply shade some parts of the churchyard, and elms apparently centuries old overtop them, while most of the thick strown graves were marked only by the moss-grown turf heaped up as is the custom with us, without a foot or a head-stone to indicate who rests below:

> "Beneath those rugged elms that yew trees shade,
> Where heaves the turf in many a mouldering heap,
> Each in his narrow cell forever laid,
> The rude forefathers of the hamlet sleep."

The church is completely mantled with ivy. It stands in a quiet nook, away from the road, and joins the great park of the Penn estate. I shall never forget the hour I spent there, and there is no spot in England of which I have so pleasing and satisfactory recollections.

It was late when we returned to the city, but not dark. There are, in clear weather, not more than four hours of a summer night when one cannot see to read with ease in London, and farther north, in Scotland, the length of the summer night is still less.

The next day we visited Kew gardens, seven miles above London on the Thames. Here is preserved the finest collection of plants in England. The garden contains many ornamental buildings, one of which is the orangery, and near it, in a beautiful grove, the temple of the Sun, in Corinthian style. Extensive flower gardens and botanical gardens are also connected with the main enclosure. The temples of the god Pan, of Solitude, Victory, &c., are pleasing structures, while the graceful pagoda gives an extensive view of this luxuriant section. The Palm House is said to be one of the finest and most extensive in Europe, and to have cost $150,000.

The distance from Kew to Richmond is but short, and the walk along the bank of the river as beautiful as can be imagined. Here we saw the remains of the old palace that Henry the Eighth gave to Wolsey in exchange for Hampton Court, and the room where Queen Elizabeth died. The green in front was the scene of grand and splendid tournaments before Henry the Seventh and Henry the Eighth, while the church near by contains the tomb that holds the remains of Thomson the author of the "Seasons," and another of Kean, the actor. Not far off stands the seat of the renowned Sir Robert Walpole, called Pembroke Lodge, now the residence of Lord John Russell. Twickenham, long the residence of Pope, and where he wrote his "Essay on Man," and other works, is not far off. The gardens around his villa there still bear the evidence of his taste and skill as a gardener. Thus another day was pleasantly and profitably occupied.

Allusion has been made to the grand Handel Festival at the Crystal Palace at Sydenham, three performances of which took place during the first week of my stay in London. Though much occupied with my visits to the exhibition of the Agricultural Society, I could not, of course, lose the opportunity of attending what was designed to be, and what probably was, the grandest musical festival that had ever been known. And so, procuring tickets, I took the train early for Sydenham, twelve miles out of London, long the residence of Thomas Campbell, where he wrote the whole of his admirable poem of "Gertrude of Wyoming."

The Crystal Palace is the same that was erected at Hyde Park for the great World's Fair of 1851, afterwards sold to a corporation of gentlemen and removed to its permanent location, with some alterations and improvements, and now with its extensive grounds and its endless variety of interesting objects on exhibition, forming truly a *crystal* palace, the most enchanting, probably, in the world. One can hardly realize, as he walks through the fairy-like courts, and the picturesque grounds filled with every imaginable form of beauty, that he is still in the real world. It is more like a dream that might follow the reading of Undine, or some other high wrought fiction of an excited brain. Architecture, sculpture and painting in all their infinitely varied forms, restorations of the most celebrated edifices in all the world of ancient and modern times, showing the whole progressive development from the dawn of art, casts of the choicest and most celebrated works of sculpture forming a vast and connected historical gallery from the earliest monuments of Egypt to our own times, and almost numberless in extent, constitute the attractions of this place.

In the British Museum one sees the real, genuine, old antiques, the very tombs, the sarcophagi, in which reposed the ashes of kings and priests, but many of them, most of them, showing the marks of time and age and exposure. But in the Egyptian court and collections of the Crystal Palace all these, temples, porticoes and gigantic statuary, are so exquisitely restored as to appear just as they did thousands of years ago, just as they were when Moses looked upon them.

Greece also is brought up before us as really as any art could reproduce it. Coming from the overwhelming grandeur of the Egyptian court and architecture, we are at once surrounded by the graceful forms, the truthful proportions of Grecian art, not by one or two or ten specimens or reproductions of its varied and beautiful architecture, but by innumerable illustrations of its various periods. What art has done to present to the eyes of the spectator the clearest realization of the life of ancient Egypt and Greece, it has done for many other countries, cities and times. Nineveh has its court, and there is the court of the Alhambra and many others.

But the treasures of nature as well as of art, have been summoned to add to the attractions of this spot. Magnificent collections of plants, both under glass and in the gardens, have been gathered from all parts of the world. The fountains of Versailles are rivaled in beauty in the grounds of the Crystal Palace. The plants of Kew gardens, nearly all that are known to botanists, exist here, also, to a great extent, and in such an arrangement as to show their geographical distribution. The collections of geology, zoölogy and ethnology are extremely rich and well arranged.

The Industrial Museum and Technological Collection forms an extremely interesting and valuable feature of the exhibition, but a description of its rich and varied wealth would lead too far. A grand agricultural implement warehouse forms another feature of this curious and interesting place. Machines of various sorts are sent thither by the various manufacturing establishments and sold at the same price that they can be obtained for elsewhere. Reaping machines, threshing machines, drilling machines, fixed and portable steam-engines, digging machines, hay tedders, drain ploughs, chaff-cutters, and every thing else in the shape of agricultural implements, are to be seen and bought at the Crystal Palace. It would require a volume to give any complete idea of this great establishment.

The gardens are laid out both in the Italian and English style of landscape. Some account of these styles is given in the official catalogue, from which I give the main features as follows :—

"In Italy, during the middle ages, internal warfare confined men to their fortresses, and no gardens existed save those 'pleasaunces' cultivated within the castle's quadrangle. When times grew more peaceful, men became more trustful, ventured forth, enjoyed the pleasures of a country life, and gardening prospered. In monasteries especially, the art received attention; but it was not until the beginning of the 16th century that a decided advance was manifest, and then we have to note a return to the style of gardening that flourished in ancient Rome itself. Lorenzo de' Medici possessed a garden laid out in the revived classical manner, and this style, which is recognized as the Italian, has existed in Italy with certain modifications ever since. Its chief features are the profuse use of architectural ornaments—the grounds being subdivided into terraces, and adorned with temples, statuary, urns and vases, beds cut with mathematical precision, formal alleys of trees, straight walks, hedges cut into fantastic devices, jets of water, elaborate rock-work, and fish-ponds dug into squares or other geometrical forms. Every thing in these gardens is artificial in the extreme, and in set opposition to the wild luxuriance of nature; and although the trees and shrubs are planted with a great regard to precision, they are too frequently devoid of all artistic effect. During the last century, the Italian style became blended with English landscape-gardening, but without much success; for the formality of the original style clings to all Italian gardening at the present day.

"English gardening does not seem to have been regularly cultivated until the reign of Henry VIII.; although previously to his time, parks and gardens had been laid out. Bluff King Hal formed the gardens of Nonsuch Palace in Surrey on a most magnificent scale, decking them out with many wonderful and curious contrivances, including a pyramid of marble with concealed holes, which spirted water upon all who came within reach,—a practical joke which our forefathers seem to have relished highly, for the ingenious engine was imitated in other gardens after that period. In this reign also were first laid out by Cardinal Wolsey the Hampton Court Gardens, containing the labyrinth, at that period an indispensable device of a large garden. The artificial style in James I.'s time called forth the indignation of the great Lord Bacon, who, although content to retain well-trimmed hedges and trees, pleaded strongly in the interest of nature. He insisted that beyond the highly dressed and embellished parts of the garden, should ever lie a portion sacred from the hand of man—a fragment of wild nature! He calls it, "the heath, or desert." During Charles II.'s reign, landscape-gardening received an impulse. It was in his time that Chatsworth was laid out, and that buildings were introduced into gardens. During his reign, too, lived Evelyn—a spirit devoted to the service of the rural genius. In his Diary, Evelyn makes mention of several noblemen and gentlemen's gardens which he visited, and some of which indeed he himself devised. His remarks convey an idea of the state of gardening during the reign of the merry monarch. 'Hampton Park, Middlesex,' he says, 'was formerly a flat, naked piece of ground, now planted with sweet rows of lime trees, and the canal for water now near perfected; also the hare park. In the garden is a rich and noble fountain, with syrens, statues, &c., cast in copper by Fanelli, but no plenty of water. There is a parterre which they call Paradise, in which is a pretty banqueting-house set over a cave or cellar.' It was under Charles, too, that St. James's Park was formed, a labor upon which the king employed Le Nôtre, the celebrated gardener of Versailles,—an artist of singular good taste, and with an admirable eye for the picturesque.

"During the reign of William and Mary, Hampton Court was considerably improved. Some Dutch features were introduced into gardening, and vegetable sculpture and parterres in lace came into vogue.

"To the Dutch must be conceded the earliest manifestation of a love for gardening in Northern Europe—a feeling possessed by them even before the thirteenth century. The taste owed its origin, no doubt, partly to the general monotony of their country, partly to the wealth of their merchants, and partly to an extended commerce, which enabled the Dutch to import from the East those bulbous roots which have long been cultivated in Holland, and were once valued at fabulous prices. Dutch gardening soon acquired a peculiar character of its own. The gardens of Loo, laid out in the time of William III., were excellent examples of the symmetrical Dutch style; a canal divided the upper from the lower garden; the beds were cut in squares, and filled at various seasons of the year with tulips, hyacinths, poppies, sun-flowers, &c.; straight walks intersected the grounds, which were adorned with numerous statues, grotto-work, and fountains, some exceedingly whimsical and curious; the trees and shrubs were cut into devices, principally in pyramidal forms, whilst hedges separated the different parts of the garden, and were not allowed to grow above a certain height. Straight rows and double rows of trees constitute another characteristic of the Dutch style, and elaborate lace-like patterns for parterres were much in vogue during the latter part of the seventeenth century. The influence of this style upon English gardens may still be perceived in the clipped hedgerows and trees, green terraces, and now only prim, now magnificent avenues, so frequent in our country.

"It would appear that from William down to George II., gardening in England suffered sad deterioration as an art. Formality prevailed to the most deadening and oppressive extent. The shapes of men and animals were cut in trees, and the land was threatened with a vast and hideous collection of verdant sculpture. Pope and Addison came to the rescue of nature, and ridiculed the monstrous fashion. Pope, in one of his papers in 'The Guardian,' details an imaginary set of plants for sale, including a 'St. George, in box, his arm scarce long enough, but will be in condition to stick the dragon next April;' and a 'quickset hog shot up into a porcupine by being forgot a week in rainy weather.' Addison, in 'The Spectator,' says, 'Our British gardeners, instead of humoring nature, love to deviate from it as much as possible. Our trees rise in cones, globes, and pyramids. We see the marks of the scissors upon every plant and bush.' Pope himself laid out his grounds in his villa at Twickenham; and his gardens there, which still bear the impress of his taste, attest to his practical skill as a gardener.

"The satire of these great writers contributed not a little to a revolution in English gardening. Bridgeman seems to have been the first to commence the wholesome work of destruction, and to introduce landscape gardening; and it is said that he was instigated to his labor by the very paper of Pope's, in 'The Guardian,' to which we have alluded. But Kent, at a later period, banished the old grotesque and ridiculous style, and established the new, picturesque treatment. He laid out Kensington Gardens, and probably Claremont. Wright and Brown were also early artists in the new style, and deserve honorable mention for their exertions in the right direction. The former displayed his skill at Fonthill Abbey, the seat of Mr. Beckford; Brown was consulted at Blenheim, where he constructed the earliest artificial lake in the kingdom,—the work of a week. Nor must Shenstone, the poet, be forgotten. His attempt, towards 1750, to establish the rights of nature in his own ornamental farm at the Leasowes, places him fairly in the front rank of our rural reformers. Mathematical precision and the yoke of excessive art were thus cast off, and nature was allowed a larger extent of liberty and life. She was no longer tasked to imitate forms that detracted from her own beauty without giving grace to the imitation; but she was questioned as to the garb which it chiefly delighted her to wear, and answer being given, active steps were taken to comply with her will. Then came Knight and Price to carry out the goodly work of recovery and restoration. To them followed Mr. Humphrey Repton, the accomplished scholar, under whose eye the gardens of Cobham Hall were planned, and under whose influence all the celebrated landscape-gardens of his time were fashioned. And as the result of the united labors of one and all, we have the irregularly-bounded pieces of water, the shrubberies, the noble groups of trees, the winding walks, the gentle undulations, and pleasant slopes,—all which combined give a peculiar charm to English landscapes.

"In the Crystal Palace Gardens, the Italian style has not been servilely copied, but rather adapted and appropriated. It has been taken, in fact, as the basis of a portion of the garden, and modified so as to suit

English climate and English taste. Thus there are the terraces and the architectural display, the long walks, the carefully cut beds, and the ornamental fountains; but the undulations of greensward give a character to the borrowed elements which they do not find elsewhere. The violent juxtaposition of the two styles of gardening—the Italian and the English—it may readily be conceived, would produce a harsh and disagreeable effect. To avoid the collision Sir Joseph Paxton has introduced, in the immediate vicinity of the terraces and the broad central walk, a mixed or transitional style, combining the formality of the one school with the freedom and natural grace of the other; and the former character is gradually diminished until, at the north side of the ground, it entirely disappears, and English landscape-gardening is looked upon in all its beauty."

But I had almost forgotten to speak of the Musical Festival. Imagine four thousand performers to constitute the chorus, and the most scientific and skilful musicians in Europe for the solos and duetts; imagine an audience of several thousands, comprising the *elite* of fashion and taste, seated under a roof of glass, and surrounded by so many fairy forms of art, and you can form some slight idea of this grand entertainment. As I had the good fortune to have a seat in the reporters' gallery, right in front of the vast choir, I could not fail to give myself up to the enjoyment of the hour, and drink in the soul-thrilling music that rolled through the great central court of this immense structure. No language of mine can convey to the mind any clear conception of this finished performance, even if space permitted me to dwell longer upon it.

The Americans had a dinner in the palace on the Fourth of July, and though I had received a kind invitation to dine with Mr. George Peabody, to whom I had delivered letters of introduction, I felt it my duty to attend, in order to help secure as large a success as possible to the enterprise. The American Consul presided, and many patriotic speeches were made. The American Minister chose to dine with Mr. Peabody, and his absence was a subject of considerable remark among the numerous representatives of the country there. I spent most of the day previous to the dinner hour, in the palace and the grounds adjacent to it.

Having met a friend from New Hampshire (the Hon. Frederick Smyth, of Manchester,) in London, he was anxious that

I should accompany him and a friend whom he had met on the passage, over to Italy. As I had seen much of the neighborhood of London, and it mattered little when I saw other parts of the country, I consented to join them, though it had not been a part of my original plan to visit southern Italy. The system of irrigation in Lombardy and other parts of northern Italy I had determined to see, but it had occurred to me that a July sun, and the unhealthy character of the climate would form an objection to going south.

We accordingly left London on the 11th of July for Paris, by way of Southampton and Havre. At Southampton we visted Netley Abbey, built by Henry the Third, but now in ruins. There is little else of interest in the neighborhood, nor is the country between there and London of special interest, either in an agricultural or a picturesque point of view. The wheat and other crops along the railway, were looking badly on account of the constant cold and rainy weather.

The passage from Southampton to Harve was one of the roughest and most disagreeable I had ever experienced. The small and crowded boat, the total want of accommodations, the night of storm and darkness,—all conspired to make us resolve never to patronize that line again. But the morning broke at last, and the high white cliffs of France gave a promise of a better time coming, and we landed safely and thankfully, all the passengers being compelled to pay sixpence steward's fee, in addition to the regular fare, though the steward had done nothing for them; had not provided them with beds, nor any thing else. One fat lady positively refused to pay, and she was perfectly right, and it was a subject of no small amusement to the lookers-on, when the officers of the boat refused to let her leave the boat. She raved some fifteen or twenty minutes, but whether she paid at last, or not, I did not learn. The route by Southampton is the longest and least desirable of any. I crossed the Channel four times by different routes. It is bad enough at the best, but a shorter Channel route is by far preferable.

Havre is one of the most important ports of France. Its docks are very extensive, and appear to be well arranged; its lofty buildings and fine open squares make the city attractive, especially as a part of it stands on elevated ground, commanding a wide prospect. It has been called the Liverpool of France.

It was not long before we were seated in the cars, and off through an undulating country, and the smiling fields of Normandy. A constant succession of vine-clad slopes, richly cultivated fields of grain, sainfoin, lucerne and potatoes met the eye, while many fine hedges along the railway and around the cottages gave a pleasing variety. No division fences appear in this part of France, the lines being indicated either by stone posts, or by the different crops.

We stopped some time at Rouen, and I afterwards spent the night there, and examined at greater leisure the many objects of interest. This was once the capital of Normandy. It is a genuine old French city, of over ninety thousand inhabitants; much of it a good deal in decay, but still possessing many fine specimens of old Gothic architecture, many of them doubtless more than a thousand years old. Some old pointed arch, some old, mutilated, saint-like statue, or some Gothic fountain, will meet the traveller at every turn. The wood work on most of the buildings is checkered over with ornaments of rich carving of grotesque heads, flowers and other fanciful creations of art, and you will see the door posts, the window frames, the beam ends all covered over with some strange device.

The old cathedral is very striking as a monument of the past, and stands preëminent among all others, while the Palais de Justice seems to be almost equally old, and covered with curious carving. Many other public edifices are full of interest to the stranger. The statue of Joan of Arc adorns a fine large fountain in the Place de la Pucelle, on the spot where she was cruelly burned to death by the English. Every thing here carries the mind back to the distant past, to a state of society and to manners and customs different from our own.

Perhaps nothing will better illustrate the peculiarities of the people than a novel mode of washing, which appeared to be very common on the continent. Coming across a stream of running water, we found a large number of women engaged in this interesting occupation, under the following circumstances. A man owns or has control of, say a hundred feet of the stream, and lets it out to as many women as can occupy it for washing. The cleaner clothes are washed above, the dirtier ones lower down the stream, and different prices are paid, according to the position. The washer-woman gets into a barrel set down into the ground, so as to avoid stooping. The owner of the right also furnishes fuel for boiling the clothes, and a grass plot for drying them. What the poor women have to pay for these extraordinary accommodations I did not learn, but something very much like this curious custom we found in many other French cities, and in Turin, and other Italian cities and towns.

Our stop at that time in Paris was only for the night, as we intended to proceed the next day; still, as it was necessary, as we thought, to have our passports *visèd* for Rome, we were put to some little trouble to seek the representative of His Holiness the Pope, and a visit to the Latin quarter and other sections gave me some slight idea of what I should have to investigate more fully at a subsequent time, when I intended to spend some weeks there.

Pursuing our journey south, the first important point of interest is Fontainebleau, something like thirty-six miles from Paris. Here is the magnificent forest and the old palace, where the kings and emperors of France, since the days of Louis the Seventh, have delighted to dwell, enjoying the surpassingly beautiful scenery, and the splendid works of art which adorn the place. Here they seem to have had a peep at paradise. The most superb fountains and gardens, lovely lakes and streams, majestic trees and groves, conspire to make Fontainebleau one of the sweetest spots in France, and it is no wonder that Napoleon and Josephine found it so congenial as a retreat from the overwhelming cares of empire. The palace is very large, occupying some ten or twelve acres; less grand in its external architecture than the Louvre at Paris, or the Tuilleries, but still most attractive from its unrivalled situation. The forest is said to cover thirty-five thousand acres.

Leaving Fontainebleau we soon arrive at Montereau, at the confluence of the Yonne and the Seine. This is a place of considerable historic interest, but my limits will not permit me to dwell here. Every thing here differs widely from what meets the eye in England. The aspect of the country, with its sunny hills clothed with vines, the higher temperature of the atmosphere, the predominant crops one sees along the way, and a thousand little details which strike us at every step, indicate the presence of an entirely different people.

After suffering from the damp, heavy atmosphere of London, liable to be caught in a shower every time one stepped out doors, it was no small relief to come into a bright, warm country of sunshine, to meet the merry, laughter-loving people of France.

About seventy miles south of Paris we saw the first hills of Indian corn that we had seen in Europe, and here only a square rod or so, of a sickly growth, that seemed almost ashamed to raise its head. Wheat and the smaller grains appear to be more common, but as we got farther south large fields of corn increase, till it becomes a staple crop. At the end of a delightful day, and an easy journey of two hundred miles, relieved from monotony by the novelty of changing scenery, and a new language, we arrived at Dijon.

I have thus far said nothing of the modes of conveyance. They differ widely in some respects from our own. The cars, always called carriages, of an English railway, are divided into coupès or partitions running crosswise, with doors at each side. Each division will seat eight persons, four facing each other. The doors are usually locked when the train starts. I do not like the arrangement. It is unsocial and exclusive. The first class cars are furnished with luxurious cushions, while the second class, though arranged in the same way, are far rougher, but still comfortable enough. The third class has no cushioned seats, and is a good deal inferior to the first and second classes.

In France the first and second classes are also divided into coupès or divisions, while the third class is usually more open, more like our own. As we wanted to see the people, to learn something of their habits, their thoughts and their ideas, we tried all classes, beginning with the first and coming to the third. In this trip from Paris we tried the third, for the first time, and rather as a matter of experiment. It was vastly more agreeable than we had found the first and second classes, as we had a far better view of the country, and I am sure, if the price had been the same, we should have taken the third class in preference. Indeed, the third class cars in France are nearly, if not quite as good, in other respects, as the second class in England. But the accommodations for railway travel in England and France are not to be compared with those in America for comfort.

We are now in the ancient and celebrated province of Burgundy, celebrated not only for its superior and popular wines, but for the part it has had in the history of Europe. The most extensive vineyards stretch along a low range of hills, beginning at Dijon, and upon them are situated Chambertin, Nuits, Romanée, and Clos Vóngeot, which have given their names to favorite varieties of wine. The vine is planted in rows, about three feet apart, and cut down to about three or four feet in height. We rode through thousands of acres, all trained in the same way, full of luxuriant foliage and loaded with grapes in great clusters, but still green. It was just the middle of July.

There is, I am sorry to say, nothing very picturesque in these extensive vineyards in this part of France. All looks more practical and less poetical than I expected to find it. No graceful festoons hanging from tree to tree, as we see in Lombardy, no vine-covered trellises, as we see in the Swiss Italian valleys, but just plain, erect, well-trimmed plants, tied to stakes. No fences separate the lands of different owners, no ditches even, but the rights of property appear to be most scrupulously respected.

The culture of the vine in this region, especially in the vicinity of Baune, dates back as far as the time of Christ, for Pliny, writing about the year 77, speaks of the vine cultivated here as very remarkable for the delicious wine made from it.

To the east of this splendid vine-producing district, and extending to the slopes of the Jura mountains, the farmers pay more attention to the raising of cattle and the dairy, more especially to the manufacture of cheese. In the hilly parts of this section they have what are called *Fruitières*, or associations for the manufacture of cheese. I had long known the nature and character of these associations as they existed in Switzerland, but I did not know that the same had been adopted anywhere else.

These associations arise, in part, from the minute division of lands, from which it happens that but a small number of cows can be kept by any one tenant or farmer, not enough to enable him to make cheese to advantage, which requires the milk of many cows united. Association is a necessity of their situation, and a *fruitière* is a company of more or less, often fifty or sixty, small farmers who take all the milk they have to a conveniently located establishment, where it is made into cheese, and the produce divided *pro rata* according to the quantity of milk brought by each member.

Long before I had ever seen an establishment of this kind, I had recommended its adoption, in lectures upon dairy farming, in districts of small farmers, in this country, where it was not practicable to make cheese on account of the small number of cows that could be kept; and I still think there may be locations where the system might be adopted with advantage. It leads to better modes of manufacture than can generally be applied in a small dairy. The cheese will, therefore, be worth a little more than it ordinarily would.

There is another feature which distinguishes Burgundy as well as Champagne, and in fact very many other parts of France. It is the social organization of the rural population. We see nothing of the scattered farm-houses, such as strike the eye and add beauty to a New England landscape. There are no isolated cottages or homesteads. The houses are all grouped in villages. You will see in some places a clump of a dozen, perhaps fifty old, centuries old, houses, as closely huddled together as in the streets of a crowded city, and then not another house, not a shed even, for one, two, three, and often half a dozen miles. These farm-house villages give a peculiar antique look to the country, and carry the mind back to the days we read of in history, when it was dangerous to cherish a feeling of safety, when union was strength against the highway robber, against strolling bands of marauders, against hordes of barbarians which, by way of diversion from their wild and daring life in the north, would make an invasion upon the territories of their neighbors, especially through this great north-eastern division of France. It is fifteen centuries since an army of the Romans and Gauls or Franks met Attila, and checked and defeated his rough legions.

I had an opportunity of seeing much of these little villages later in my trip, and to make a note of their advantages and disadvantages in an economical and social point of view. The land directly about them is held very high, or commands a very high rent, while the more distant farms requiring expense of cartage, are cheaper.

Within, these clumps of rural dwellings present many curious and characteristic scenes of domestic and country life. As the shades of evening deepen, the cows begin to come in from all sides in considerable herds, stopping to drink at the large fountains, and then marching off to their well-known pens, often in the basement of the house, or in a yard close to the door; and at morning, at the sound of the herdsman's horn, they start out from this door and that, to join the flocks, and be off to the distant pastures. In Switzerland and northern Italy, particularly among the valleys of the Alps, I have seen flocks of as many as four hundred goats coming in at dusk under the charge of shepherds or goatherds, the bells all tinkling in merry but inharmonious music, and shooting into their own well-known doors, sometimes one or two at a house, sometimes a dozen belonging to one owner. They feed in common upon the mountains, and come home to be milked.

But in these rural villages of France, fewer goats are kept. Flocks of sheep often come in with the herds of cows, and start off again in the morning. At harvest-time, great loads and little loads, of wheat, and hay, and oats, on ox-carts, and horse-carts, and donkey-carts, and on the heads of women, will be seen coming into these little villages from all points of the compass. The workmen, the vine-dressers and the ploughmen start off together in the morning to the scenes of their daily labor, and return together at night.

I could not help thinking that this mode of life, so common in the rural districts of France, accounted in a great measure for the characteristic social element in the people of this country. At night, when the work of the day is over, the whole population of a large neighborhood is collected together; the men to sit in great crowds over their wine and their pipes, talking over the adventures of the day; the women, perhaps, with their knitting or their sewing, and plenty of good-natured babies. The whole scene is one of sociability and genial fellowship. This constant mingling together and comparing notes, really constitutes a farmer's club, meeting every evening, in summer as well as winter, and has the effect of keeping its various members from falling behind others. A constant comparison has a constant stimulus to exertion, and if it does not lead to rapid progress, it keeps the whole village, that is, the whole surrounding farming population, along a pretty nearly equal pace.

What a contrast between the farmer's situation in those parts of Europe, and our own! With our isolated homesteads we can hardly meet our neighbors more than once a week; often not that. We may go to church once a week. Their churches are open constantly, and though they do not stop to hear a long sermon, they go in and out freely; very many of them every day. The effect of this close neighborhood may, in some respects, be bad; but in others it must, it seems to me, be very beneficial.

We arrived at Dijon about dusk, not knowing where we should lodge, but soon found agreeable and commodious rooms at the Hotel de Jura, near the station. The next morning, long before the inhabitants of that quiet town were stirring, we were "doing the place." Near the gate we found the ruins of an ancient church converted into a barn, the nave and lofty arches filled with hay. Old ruins, to one fresh from a new world, had their charm, of course, and so had this old barn. The museum, which we visited later in the day, contains a large collection of old Roman relics collected in the vicinity, many of which possess great interest, especially to the traveller who sees them for the first time.

Among the many excellent paintings, an exquisite St. Cecelia, presented by the emperor, was the most beautiful. The coloring is superior to any thing we had seen in Europe. We learned afterwards that most of the museums of the inland towns contained works of art of high merit, from the same source. The emperor evidently means to keep himself before the people.

After leaving Dijon for Lyons, we soon come to the river Soane and follow down its winding course, passing Chalons, Macon, and other prominent towns situated upon its banks. Here commences the great south-eastern division of France, the principal characteristic feature of which are the great valleys of the Rhone and its tributaries, of which the Soane is one. In general prosperity this district is the second in France, a circumstance due very much, no doubt, to the existence of the large cities of Lyons, St. Etienne, Nismes, Montpellier and Marseilles.

The most northern province, that of Ain, lies at the foot of the Jura. Here has been for some years a somewhat peculiar treatment of clay lands. In some parts of this region the soil is stiff, and almost impervious. Here we see a great many dams constructed to hold water in the form of ponds. Every third year the water is drawn off, the fish taken and sold, when the land is cultivated for one year, and then again flooded. The number of these artificial ponds is said to be no less than fifty thousand, and the number of acres covered by them, fifty thousand. When the news of the modern system of drainage penetrates that region, such a practice will go out of date, it is hoped.

At Macon, on the way to Lyons, the traveller is struck by the peculiarity of the head-dress of the women. Two or three specimens take a seat opposite to us in the car, and the first thought is that of surprise at the great black thing on the very top of the head, more like a modern chimney-top ventilator than any thing else I can compare it to. Are they in mourning? Are they altogether sane in the region of the skull? After considerable delay as to whether it would do to quiz them on so important a point as a lady's dress, we at length muster up courage to display our limited knowledge of French by asking for information on this great question. They were, as was to be expected, infinitely amused at our curiosity, and took considerable trouble to explain that such was the common head-dress of the women of Macon and its neighborhood. This two-story arrangement of a sort of black muslin was set upon the very top of the head, where it could do no earthly good by way of protecting the brain from the cold, and very little from the heat of a southern sun. It is unique and comical.

But here we are in the city of Lyons, the city of silks, the rival of Paris in commercial importance. It is a city of hills on which it sits as upon a throne, with the Soane and the Rhone at its feet. Without loss of time we engaged a carriage and drove over the most interesting parts of the town, calling at some of the most extensive and noted silk manufactories, of which there are no less than seven thousand here. They are lofty buildings of many stories filled with hand looms from top to bottom. The workmen very politely showed us the process of weaving silks and velvets, and how the beautiful figures are wrought in. Among others, a life-likeness of Abraham Lincoln was shown us as just finished.

A lofty hill rises above the city, on the top of which stands an old, celebrated convent. It was in the ascent to this beautiful spot, just before the setting of the sun that the glorious form of Mont Blanc first burst in all its majesty upon our view, and I could not help shouting out, in true sophomoric style, the well known apostrophe of Coleridge, so often repeated as a college declamation, beginning—

> "Hast thou a charm to stay the morning star
> In his steep course? So long he seems to pause
> On thy bald, awful head, O Sovereign Blanc!"

The atmosphere was clear, and the sun lingered upon and lighted up the eternal snow and ice of the grandest mountain peak in Europe, tinging it with red and pink, so that, though many miles off, it seemed but a short distance from us.

A beautiful incident occurred here, which illustrates the respect for the dead so common among many European nations. Just before arriving at the summit, our driver exclaimed, "*c' est le cimetière*," that is the cemetery, in a peculiarly hushed and subdued tone, which indicated the reverence which he felt for the object to which he called our attention. This is akin to the respect the Frenchmen manifest by always stopping and raising the hat on the passing of a funeral procession.

When Julius Cæsar led his Roman legions across the mountains for the conquest of Gaul, Lyons was so small and insignificant that he did not even name it. He halted and pitched his camp upon this hill, and left such permanent marks here that the lapse of nearly twenty centuries has not effaced them. The Gauls were then divided into many petty nations or tribes. Cæsar conquered many of them, and after his death, one of his friends, together with many soldiers who had fought under him, founded a colony at the foot of the hill, at the confluence of the two rivers and built up the city, which became a sort of centre of communication of the great military roads that Agrippa marked out under the command of Augustus; and it was acknowledged as the chief of more than sixty cities of the Gauls, who built there at common expense a magnificent temple to Augustus, where he was worshipped as their divinity till the reign of the Roman monster Caligula, when it was appropriated to the use of an academy. This was subsequently burnt, and now, on the spot where it stood, rises the church of Ainai, a monument of a former age, its dome supported by four granite pillars. Then there is the cathedral of St. John, enriched by many a souvenir of the early crusades, and the Hotel de Ville, with its architecture of Louis Fourteenth, whose equestrian statue stands as one of the chief attractions of the Place Bellecour, one of the most magnificent squares in Europe.

The most beautiful part of the city is on a tonge of land between the Soane and the Rhone. In spring and summer, when swollen by the melting of snow upon the mountains, the Rhone is much larger than in winter, but the flood of the Soane is in the winter.

The Rhone rises on the St. Gothard, and runs first into Lake Geneva, and after resting awhile, glides on, pure and clear, but is soon joined by the muddy Arvé, and enters the borders of France. The basin of the Soane and the Rhone, in France, includes an area of no less than twenty-eight millions of acres. This great river may therefore be considered as the only channel by which all the waters of this immense Mediterranean basin are emptied into the sea. Its length is about six hundred miles. The Arvé brings to it the waters from the west slope of the mountains of Savoy, including Mont Blanc. Then comes the Soane, and, below Lyons, the Isère brings down the waters from Mont Cenis and the valleys below, and still lower down the Drome and the Durance.

We left Lyons by boat early in the morning, for a run of nearly two hundred miles down the Rhone. I shall never forget the impression this trip made upon my mind. The banks of the river are often very steep, hemmed in by lofty hills, covered with vines from the base to the top, while the ruins of old feudal castles and Roman chateaux lend a constant charm to its whole course. Tradition points to a little spot a few miles below Lyons as the tomb of Pontius Pilate. It is an old monument, only a few rods from the river, of great antiquity. It is well known that this region was a Roman province in the time of Christ, and a thousand remains of this flourishing period still show the degree of civilization to which they had attained here. Witness the old bridge at Avignon, and the castles and watch-towers all down the banks of the Rhone. But I do not know on what specific foundation the tradition rests, or what color of truth attaches to it. From the numerous other traditions of this conscience-stricken wanderer, along this river, it is altogether probable that he visited this region during the latter part of his troubled life, and perhaps his bones were laid where the tradition places them.

I did not believe, at the time, that the Rhine could be more beautiful than the vine-clad Rhone, and I do not think now that it is. The celebrated Hermitage vineyard crowns the sides of a lofty hill on the left, and a little lower down on the right, but two miles from the river, is the almost equally celebrated St. Peray. It is, I suppose, the quality of the soil that gives this section its high reputation for the quality of wine; but the location of the Hermitage is unsurpassed, lying in a great basin, with a southern or south-western exposure. Thousands of acres along the Rhone are terraced up the sides of lofty hills with incredible labor, step rising above step in almost endless succession.

In the more southern part of this valley the culture of the mulberry begins, and we are scarcely out of the old city of Avignon before the whole face of the country appears to be covered with mulberry trees. In 1789, it is said, the produce of the mulberry district was six thousand tons of cocoons worth $3,000,000. In 1853 it had increased to 25,000 tons, worth more than $20,000,000. I suppose the whole process of silk growing is more manufacturing than agricultural, still the care of the trees and gathering of the leaves partakes of the latter character. This does not take much time, and on a plantation, wholly or chiefly devoted to this business, the subsistence of the whole year depends on the labor of a few weeks. When all goes well the silk growers prosper, but bad years often bring great distress upon those who rely mainly upon this industry. It is uncertain, and often depends on circumstances over which the laborer has no control.

We here come upon the olive, also, and all the way to Marseilles, with the exception of a vast tract of barren sand, the olive grows with luxuriance. The fig also grows here so easily that it is seen in the most barren sands and rocks, clinging as tenaciously as our white birch or the pine. I was astonished to see fine shrubs loaded with figs along the railway, shooting up wherever a vacant spot could be found, and hardy as a weed. The vine is also to be found here, but it is not so common as farther up the river. Heavy crops of wheat, madder, tobacco and vegetables are seen in every direction. Still farther south, in Provence, the orange and the lemon flourish, but I did not penetrate into that province.

The way to Marseilles lies through a vast barren tract, extending it is said over thirty thousand acres, but before reaching the great port of the Mediterranean, groves of olives and mulberries begin to reappear, and a large region is covered with orchards of them. The olive grows on a tree often as large as a medium sized apple tree, and where much care is given to it, appears in rows well trimmed or headed in, but when neglected, as we saw it around Nice, grows straggling and wild, and is covered with black warts and a rough bark, like a badly neglected plum tree.

Passing through one of the longest tunnels in France, we are at once in Marseilles, and in a few minutes riding over the city visiting the most noted churches and cathedrals, the most popular drives, and other points of interest. Here we first heard through the American consul of the reverses which had befallen our hitherto victorious arms, in the battles near Richmond, and it was with a heavy heart that we left on a pretty little steamer to run round to Nice, the first trip on the blue waters of the Mediterranean. It was a clear summer's night, and we sat long watching the shores on the southern coast of France, and the distant peaks of the Alps, whose lofty spurs reach almost to the sea.

Early morning brought us into the pretty harbor of Nice, and here, as elsewhere, we lost no time in securing an open carriage for a drive to the objects of interest in the neighborhood. It was hot and dusty, but that was to be expected. Nice formerly belonged to Piedmont, but now to France. It is a flourishing city of some thirty-five thousand inhabitants, largely engaged in the preparation of silk, thread and perfumery. A lofty peak rises up between the old town and the new, close by the shore of the bay, and affords a most beautiful and extensive view of the sea, of the city at its base, and of the surrounding country. This peak is covered with trees and walks, cemeteries and an ancient chateau. The century plant here grows wild and luxuriantly, and some few had shot up their rare and lofty flower-stalks, and were covered with beautiful blossoms. The fig, the olive, the mulberry, the peach, and other fruits are abundant, in and around Nice.

Cimiés is some four or five miles out of the town, and contains an ancient and extensive convent, and the interesting ruins of a grand old Roman amphitheatre, which we visited. Its size indicated that it must have been made to accommodate many thousands of people.

Here the grounds around the numerous villas were surrounded by very high fences on either side of the road, built solid, so as to make them very difficult to scale, to prevent the access of intruders. Every thing indicated the most careful guard against theft. The profusion of fruit and the luxuriance of vegetation characterize the whole country. Nature is lavish of her favors here.

A day was all that we could devote to Nice, but it was sufficient to see the town, the churches and the country around, and just at night we were on the way again for Genoa, and the next morning found us entering the harbor of that beautiful city of palaces, the port of Sardinia.

Genoa contains a population of nearly a hundred and fifty thousand, and manufactures large quantities of filagree silver articles of various descriptions for export. The cathedral of San Lorenzo, built in the eleventh century, is a very imposing structure, while the Chapel of St. John the Baptist, connected with it, and into which no female is allowed to enter except on one day in the week, is the richest portion of it. What could have led that old Pope Innocent the Eighth to impose such a restriction upon the freedom of women? Was it paternal solicitude? fear of disturbing the devotion of his dear sons? And why admit the pretty feet to cross the marble threshold at all after excluding them six days in the week? I do not know that tradition has left a satisfactory answer.

St. Annunciata and St. Maria Carignano are magnificent churches. The hilly suburbs of Genoa are crowded with many splendid villas, long ranges of fortifications, richly cultivated orchards and gardens, and the view of the Mediterranean is full of grandeur and beauty.

A day or two is sufficient to see Genoa, and the same may be said of Leghorn, especially for a party of four, when it is a matter of economy, both of time and money, to keep a hack at command and to keep it at work. Still it may be said that it is a luxury to linger longer and give one's self up to the enjoyment of an Italian landscape. That was not our object. We were not there for pleasure, and I think we made as much of the time as any other four travellers that had preceded us, and that our powers of endurance and capacity for work astonished the luxurious Italians quite as much.

We cannot say very much for the agriculture of Italy as a whole, though we may place that of Lombardy and in the neighborhood of Genoa, where agriculture still maintains a high degree of perfection, judging from the results produced, in the front rank. In many other parts it languishes to such an extent as to make it difficult to appreciate the fact that it is only three or four hundred years since the agriculture of Italy was the first in Europe. The ancient splendor of this country, so far as represented in its agriculture, is gone. Either it has positively deteriorated, or else other nations have so far outstripped it in progress as to leave it far behind.

And yet there are locations, as already intimated, where nature and art combine to produce the most astonishing results. The climate is favorable in the highest degree for the growth and perfection of many kinds of fruits.

The life of the people seems to be devoted much to the pursuit of pleasure, though not so much as in more southern Italy, where pleasure appears to be the only business of all who can manage to live without doing any thing. The Corso, or grand promenade, is the place for courting, where anxious mammas send their pretty, dark-eyed daughters, in their splendid silk dresses, their white gauze vails, called *pezottos*, fluttering around their slender, fascinating figures, to grace and embellish the person, without even casting a shadow upon their sweet faces. Social life would appear to be at a low ebb, and the track is resorted to as a substitute, as a place to show off to best advantage the many fine points of the young ladies and the young gentlemen who are too glad to avail themselves of its superior facilities.

Another grand opportunity is afforded at the villa Pallavicino, a beautiful elevated pleasure-ground, adorned with temples, ruins, Swiss chalets and pagodas, among groves of laurel and other graceful trees, rocks, lakes and hills, giving the finest prospect imaginable to the curving, half moon harbor, and so off over the blue waters of the sea. As you pass through the pretty artificial grotto made of the most gorgeous stalactites, you come out upon a little lake of clear, crystal water, surrounded by obelisks and other ornamental structures, rare flowers and seats of porcelain, jets from unseen fountains and marble temples, and the stranger might easily persuade himself that he is in the land of the fairies.

We cannot forget that this beautiful city was once the seat of a proud republic, and the old marble palaces, now either in ruins, or converted to the baser purposes of life, only serve to remind us of the wealth and splendor of a haughty nobility. Our hotel was one of these palaces, situated upon the very shore that once gave shelter to a thriving commerce, that reached out its strong arms to gather in the riches of many less favored lands. There is here still the aristocracy of a past age, who, without comprehending the spirit of the present, or without the energy to direct it, take no part in its development, but look back upon the grandeur of their ancestry, vainly hoping, like Wilkins Micawber, for something to "turn up." They sympathize little with the activities of the hour, and were it not for the growing power and influence of other classes who once looked up to them in humble obeisance, little hope would there be for a newer life and glory for Italy.

But the hour is coming. We cannot look upon the splendid marble monument and statue of Columbus that adorns this city, without a thought of the faith that led him to look over the sea to a new and fresher world beyond, and the changes going on around us, point clearly enough to the dawning of a brighter day, and quicken our faith in the future prosperity and happiness of a country which once stood forth to the world as a model of human greatness and civilization.

Our course lay through Leghorn to Pisa and Florence. The tourist always stops at Pisa to see the leaning tower, and the far-famed cathedral. The tower is the campanile, built for the bells of the cathedral long ago, when Pisa, but eight miles from the mouth of the Arno, was powerful, the head of a great republic, independent on the sea and on the land. It is only since the beginning of the fifteenth century that it has formed a part of Tuscany. The jealousies and the struggles to which they gave rise, between Pisa and the republic of Genoa and that of Florence, ended at last in a death-blow from which the former never recovered. But the cathedral, the tower, the baptistry, and the Campo Santo still stand, as the gray monuments of its age of glory, extending over a long period, from the tenth to the fourteenth century. In this old cathedral, built in the eleventh century, Galileo, then but eighteen, first discovered the principle of the pendulum, which was suggested by the swinging of a lamp suspended from the ceiling. Here is an old antique statue of the god Mars, found near by, and to make it at all appropriate as an ornament to a Christian church, it was baptized, or christened—a marble statue—as San Piso.

The Campo Santo is a museum of monuments, or tombs, the corridors filled with headless, or noseless, or armless, or otherwise mutilated figures, while the soil of the graveyard, surrounded by a marble railing, was all brought from Jerusalem in fifty galleys owned by the republic.

After tearing ourselves away from the crowd of the most abject and troublesome beggars, men, women, and children, whose importunities were in the highest degree annoying, we ascended to the top of the tower, and had a fine view of the whole surrounding country. The neighborhood is very productive; in fact one vast fertile plain. Apples hung in immense quantities. The grape is here trained to trees planted for the purpose, and allowed to climb often to considerable heights, and not kept down as in the vineyards of France. Mulberries are growing everywhere. Here we saw grain threshed by the treading of cattle, as in ancient times. In the yard of almost every farm-house is a large circular floor, which appeared to be paved or laid in a kind of cement, made for the purpose of treading out the grain. The ploughs were of the most primitive construction, having one upright stick which served for a handle fastened into a log of wood bent so that one end would root into the ground. The other implements were of nearly equal rudeness, and yet the crops, owing to the richness of the soil, to high manuring, or to some other cause, appeared to be luxuriant, and to yield in abundance.

During much of the journey in this part of Tuscany, women of all ages were seen gathering the grass and herbage along the railway and by the sides of the road. Every thing that would do to braid was pulled, laid in heaps till the load was sufficient, and then lugged off on the top of the head. It reminded us of the old woman of Goldsmith's "Deserted Village":—

> "Yon widowed, solitary thing
> That feebly bends beside the plashy spring,
> She, wretched matron, forced in age, for bread,
> To strip the brook with mantling cresses spread."

It was only another of the innumerable instances of the careful and minute painstaking to save every thing that could possibly be turned to account. Here, and in many other parts of the continent, we often saw women and boys going about the streets, picking up every thing that could be made into manure, the droppings of cattle and horses, with the most scrupulous care, sometimes in aprons, more frequently in baskets, which when full were thrown over the shoulder, with straps to come under the arms, and borne off.

We passed through the valley of the Arno, and arrived at Florence towards evening, and the next morning went to drive to the top of Fiesolé, to look out over the whole region of Florence—a landscape of surpassing loveliness. At our feet almost stood Mario's villa.

Fiesolé was built by the Tuscans, long before the foundation of Rome. Parts of the immense walls of the ancient town are still in perfect preservation, though their antiquity can be traced for more than four thousand, some say five thousand years. There is, I suppose, no doubt that they have stood more than four thousand years. Here we went through and had the satisfaction of seeing the management of vineyards, under the guidance of the tenant, who appeared to be very intelligent and to take an interest in showing us the objects of most interest, and among others the ruins of an ancient amphitheatre, with the dens where the wild beasts were kept till let out into the arena. We descended into these, and could see where the food was let down. They are in fact nearly as perfect as when made. Here we saw and could handle the Tuscan plough, and study its not very elaborate construction. It suggested the query, why don't some American implement maker establish a commission for the sale of his wares in this old country?

The grapes here, as in other parts of Italy, were trained to trees planted for the purpose, and not allowed to grow more than fifteen or twenty feet high, and the vines hang often from one to the other in graceful festoons, which give the whole a peculiar beauty, which none of the vineyards in other parts of Europe possessed. Here, as elsewhere, powdered sulphur is sprinkled over the grapes, to prevent the disease which has been so fatal to the grape for the last seven or eight years. It is said to be effectual. After a shower, which washes off the sulphur, it has to be renewed. We saw many of the clusters already attacked by the disease, but if the sulphur is immediately applied it arrests its progress.

Florence is one of the most attractive cities in Europe, both from the beauty of its situation and the riches of its artistic collections. A drive on the Cascine, or in fact in any direction beyond the walls, carries us through orchards of fruit trees, peaches, pears, figs and magnolias; while the innumerable marble palaces, churches, and other costly edifices, attest the grandeur and magnificence of the days of the republic, when art established here her seat, and wealth gathered in from other Italian cities and towns the numberless relics of the past, of Tuscan splendor and Roman greatness.

It would be impossible even to give a faint idea of the collections of the old masters within this city without going beyond the proper limits of this sketch. The church of San Lorenzo, with the splendid sacristry, and Michael Angelo's chapel, containing the great original of "Day and Night;" Santa Croce, with its beautiful paintings; the Pitti Palace and Museum, containing such world-renowned works as Canova's Venus, the Young Apollo, and a thousand others, almost equally celebrated; the cathedral, built with the design "of being the largest and most splendid building which it was in human power to erect, and so perfect that nothing more beautiful or larger could be thought of—decided upon by most of the citizens united in one will;" the bronze gates of the baptistery, on which Ghiberti worked for fourteen years, and which Michael Angelo declared to be worthy to form the gates of paradise, all point to a period when, as Machiavelli declared, "our city was in a condition of unparalleled prosperity and success; when she was affluent in people, treasure and honor; when she possessed thirty thousand citizens capable of bearing arms, to which seventy thousand might be added from the country. The entire population of Tuscany obeyed her partly as subjects, partly as allies, and though distrust and hatred prevailed between the nobles and the people, yet, so far, no evil results had followed, but all lived united and at peace."

But war came upon her, as it may come upon other republics and nations, and Guelphs and Ghibellines broke in upon the harmony, and destroyed the prosperity of the country, by their private family quarrels and their contentions, which led to bloody and relentless war, till the Florentine republic sank, after two centuries of prosperity, and foreign princes took the reins which mad partisans could not hold. Republican liberty fell, and notwithstanding a mild absolute government followed, the people have longed in vain for the independence which they so foolishly threw away. Judging from the tone of those with whom we came in contact, there must be many here who are burning for the struggle for liberty to begin, and all seemed to look to Garibaldi as the champion who in some way or other would lead them to a higher political life and being.

It was almost impossible to sleep here, the noise in the streets being kept up all night, troops of boys or men perambulating the streets singing operas. Women stood along the sidewalks frying pancakes, for sale all hot and steaming from the pan, and thousands came early in the morning of Sunday to the market, bringing fruits of every description, grapes, peaches, pears, plums, fine and cheap, loaded on the bending backs of stupid donkeys, and some with hens and chickens, with immense red crowns, which are here, as in Genoa and Leghorn, cooked and eaten as a great delicacy. Sometimes we would see the lazy men riding, and the hard-working women leading the horse or donkey with a cart loaded with vegetables. These are trifling circumstances, to be sure, but they serve to show us the characters and habits of the people.

In passing through the streets of Florence we often see houses bearing over the door, or on the front, some inscription in gilt letters, such as "Here lived and died the prince of tragedy, Alfieri;" "Here dwelt Machiavelli;" "Here lived Dante;" while the house of Michael Angelo is still preserved just as it was when that great artist lived in it, with the furniture and the decorations preserved, and it now belongs to one of his descendants. It is open to visitors two or three times a week.

About ten miles out of Florence we saw a cattle-show, held in a beautiful grove, near the banks of the Arno. The cattle, all of a dark iron gray, the black predominating on some parts, and on others the white a little, but all uniform, with lofty branching horns, decorated with colored ribbons and variegated tassels, came in from considerable distances, and we had a good opportunity to see and admire them.

At Leghorn we had a bath in the Mediterranean, and a taste of the little miserable oysters, the best the sea afforded, but infinitely inferior to our own. In fact they were quite detestable, but it had been so long since we had been able to get oysters of any kind, that we made up our minds to worry them down.

It had been our desire to take the inland route from Florence to Rome, and so on to Naples, but the state of the country was so unsettled and so infested with banditti, that we were invariably advised to abandon our intention and to go by another way, round by sea. I had heard the Earl of Derby remark, in the English House of Lords, that there were, at that time, no less than sixteen thousand of these roving bandits in Italy, and as we had no time to bother with them, we concluded that "prudence was the better part of valor," and so took the slow sailing steamer Sicilia, directly for Naples, running down in sight of Elba, Corsica and Sardinia, and of the great dome of St. Peters at Rome, distinctly seen, though twenty miles off. The time glided quickly away, and we at last came in sight of Ischia and Procida, and that great smoking chimney of the earth, Vesuvius, and not long after rounded about into the grand and beautiful Bay of Naples, passing Baiæ and Pozzuoli, and soon coming to anchor near the shore.

The situation of Naples is probably finer, on the whole, than that of any other city in the world. Grandeur indeed is as much a characteristic of that city, as size is of London, or beauty of Florence. We were soon located in comfortable quarters, looking out upon the bay, and in sight of Vesuvius, and after the necessary preliminary arrangements, took a drive over the city to get as good a general idea of it as possible at the outset, and then over the beautiful road to Pausilipo. This was just at sunset of an excessively hot day, and all the fashion and splendor of Naples appeared to have turned out for an airing, after being shut up all day in their houses to avoid the heat. It gave us a better idea of the life of that class of people than we could have got in a week at any other hour of the day. We met the two princes, sons of Victor Emanuel, who were in Naples at that time, and showed themselves freely to the people.

The streets of Naples are paved with lava, and like those of most other southern cities are narrow, the houses very lofty, an arrangement no doubt designed for protection from the heat of summer. All the buildings have that peculiarly light and airy coloring which is seen in the paintings of southern European cities. They are built mostly of tufa, a kind of volcanic rock, very easily quarried. The environs of the city are as attractive as the city itself, more so in fact. Innumerable villas overlook the circling bay, most of them surrounded by gardens and walks shaded by the beautiful trees, olives, blossoming oleanders, vines with their luscious clusters hanging in graceful festoons, groves of oranges and lemons, loaded with their golden fruit, and pomegranates in the utmost profusion. We remained here nearly a week, and hot as it was, improved every hour.

Pompeii is about twelve miles from Naples, and we started very early in the morning to spend a day among its strange and interesting ruins. It is well known that this luxurious city was overwhelmed and buried by the ashes and cinders of Vesuvius in the year 79 after Christ, and that it remained wholly unknown down to about the middle of the last century, when it was accidentally discovered, and excavations commenced. Nothing has thrown so much light upon the domestic economy of the ancients as the discoveries which have been made there. It stands forth now an immense city, though not yet all laid open. Many men, when we were there, were employed in the excavations under the direction of the government, and we saw many of the articles which had been recently found, as well as an immense number that have been discovered there during the researches of the last century and a half, now preserved in the Museo Borbonico at Naples.

We see Pompeii just as it was nearly eighteen centuries ago. The gates, the walls, the streets, the fountains, the public baths, the Forum, with its lofty and magnificent marble columns, the tombs, the temples remain, though stripped, to a great extent, of the magnificent works of art, the inimitable frescoes, and other decorations which adorned them when all was so suddenly swallowed up. As we stand and gaze upon the whole or upon any of its splendid parts, one cannot help a feeling of wonder and amazement at the vast wealth, the boundless luxuriance of this corrupt city. The pavement of the streets appears with its solid stone, worn, in many places, into deep ruts. Bakers' shops, and stalls used for an infinite variety of purposes, all indicated by characteristic articles found in them, are as easily distinguished as the same among us. We saw loaves of bread that were baked eighteen hundred years ago, as perfect in form and shape as if just from the oven, meal, figs, eggs, spices, plums, cooking utensils, and a thousand other articles taken from Pompeii, and still quite easily distinguished, many of them indeed perfectly preserved. Bedsteads, both of wood and iron, were found, and many implements of brass and iron, stone and earthen-ware, bells, trumpets, gridirons, bronze saucepans, colanders, kettles, ladles, pastry and jelly moulds in bronze, hot water urns, much like our tea urns, lanterns with horn lights, spits, and many other kitchen utensils, chains, locks, bolts, portable fire-places, iron stoves, dice, a lady's toilet complete, combs, rings, thimbles, paint for the cheeks and brushes for using it, cosmetics of various kinds, earrings, and fruits, such as almonds, dates, nuts, grapes, chestnuts, many kinds of apothecaries' medicines, and quack advertisements, a box of gilded pills, various surgeons' instruments, a good deal like ours, play bills, ivory opera tickets, bits for horses, cruppers and stirrups, candelabras, and lamps of exquisite grace and elegance of form, scales, and a very great variety of gold and silver and bronze coin, finger rings of endless variety of form and device, many with seals, fowls and game ready for cooking, oxen, sheep, fruit of various kinds, in glass jars and dishes, and other articles, all of which give an idea of the extent of civilization and luxury existing there at the time. The ceilings and walls of many of the houses are still covered with fresco paintings with the colors as bright apparently as the day they were put on, and wonderful for the skill and art with which they must have been finished. The floors of a large proportion of the houses which we entered were laid in splendid and costly mosaics, which are still perfect and beautiful. The temples were, many of them, remarkable for their splendor. The theatres still stand, with their seats rising up row above row, just as they were built. The immense amphitheatre, capable of seating perhaps twenty thousand people, is still preserved. A mere allusion to the many interesting objects at Pompeii would lead too far. The city is, perhaps, three or four miles from the base of Vesuvius, and now nearly that distance from the shore of the bay, which is supposed to have receded by the elevation of the land at the time of the eruption, as there is sufficient evidence that the city stood directly upon the shore originally. Indeed the immense rings for mooring vessels are still to be seen in the walls on the side towards the harbor.

Herculaneum is three or four miles nearer to Naples. That was buried at the same time from sixty to a hundred feet deep, and is far more inaccessible than Pompeii, from the fact that a large town, Portici, now stands directly over it. But we descended with the aid of a guide and torches, and explored its immense theatre, magnificent in its proportions, and went through more or less of the houses, but very little is to be seen, compared with Pompeii.

The next morning, by three o'clock, we were up and off again for the ascent of Vesuvius. The road as far as Portici, the same as before. Then we turn and commence a gradual ascent on small ponies. About a third of the way up we pass the vineyard of the celebrated lacrima christi wine. The vine crowns the foot and sides of the mountain, and grows in great luxuriance far up. A considerable part of the way lies over immense fields of solid lava, which only four or five years ago flowed down and destroyed many acres of valuable vineyards, and many houses. Leaving our horses at the foot of the cone, in a kind of valley which was no doubt the former crater, now shut in by Somma and Vesuvius, which at the time of the eruption probably were united in one peak, we had to climb the steep and ashy cone on foot, a feat of no small difficulty, owing to the want of foothold in the loose debris which constantly gives way under the feet. But we got up at last, and looked down into the frightful crater. From the top of Vesuvius the prospect is most grand and beautiful, embracing many a point of great historical interest.

Another excursion took us to Pozzuoli, in the opposite direction from Naples, after we had visited the Lago d'Agnano and the Grotto del Cane, a region alive with volcanic action. At the grotto the hot sulphurous vapors rise with such force, that a few seconds only are sufficient to kill a dog, an experiment which was tried in our presence, when the poor fellow was thrown into such convulsions that he was long in coming to life again. In the pond near by myriads of frogs appeared to suffer from the same cause, the impurity of the water, for they constantly leaped up from the surface of the water, as if to get a breath of air. Immense loads of flax and hemp were being rotted in the old fashioned way along the shores. On the way to Pozzuoli we pass also large fields of hemp growing in the shade of trees.

Pozzuoli is an ancient city of much interest, containing a vast amphitheatre, now in ruins, a magnificent temple of Jupiter Serapis, and many other antiquities. Here is where Saint Paul landed on his way to Rome. Lake Avernus, which Virgil and the old poets represent as the descent into hell, is near by, and so are the classic shores of Baiæ. We passed by the tomb of Virgil, both in going and coming. It is in a lovely spot, overlooking the bay.

Another drive took us to San Elmo, and the convent of San Martino, adorned with the most costly paintings. They had been offered, as the monk who showed us through said, no less than eighty thousand dollars for a single painting. I will not attempt to describe the splendid museum of Naples, the richest, in some respects, in the world. We visited it several times, but could not see enough of its antique works of art and the many collections from Pompeii, Herculaneum, and other excavated cities.

The beggars in and around Naples are the most importunate of any we found in Italy. We could not escape them. They met us at every turn, and seemed determined to extort a few carlini from us wherever we went. At the amphitheatre at Pompeii, there appeared a poor cripple who implored so earnestly for aid, that one of our party gave him a pretty good present, but our backs were scarcely turned before he jumped upon a splendid two hundred dollar horse, which our guide said no doubt belonged to him.

There is a feeling of insecurity in southern Italy which is felt nowhere else so strongly. Many a man we met would probably have taken life for the smallest reward. One of the bandits who dogged our steps to the very top of Vesuvius, had killed a man in the December previous, and had kept concealed among the mountains ever since, was an interesting piece of information which our guide gave us when we had got safely down. You feel among them as if you might "wake up some morning and find your throat cut from ear to ear."

The upper classes seem to live here for pleasure alone—a degenerate, enervated race, who pride themselves on the grandeur of their old family history. It is owing in part, perhaps, to the effect of the climate, and in part to their political institutions. But the lower classes appeared to be industrious. Mechanics of all kinds were at work in the open air, generally in the streets. Men work naked for the most part. We saw thousands in Italy with scarcely a rag to cover them. Italian life is very much out of doors.

We entered the states of the pope by way of Civita Vecchia, where our passports were taken from us, with the information that we should find them at the office of the chief of police in Rome. Our baggage was examined with great care, and it was only after considerable trouble that we got well seated in the train, and began to move on slowly through a dreary, parched, and wretchedly cultivated country, the least attractive of any we had seen in Italy.

The campagna which stretches in every direction some miles around Rome, is covered with rank coarse wild grasses, which indicate a soil naturally fertile, but neglected and left to take care of itself. Large herds of cattle were seen in some parts of this tract, looking not very unlike the Tuscan cattle described on a previous page; but I saw none that I should have been tempted to import, had it been my object to seek the best stock in Europe. It was late in the afternoon when we arrived.

No sooner had we secured rooms than we were on our feet for a walk to the Capitol, for the purpose of getting an accurate observation of the city. From this elevated standpoint, the eye takes in an area more completely covered with the footprints of history, perhaps, than any other in the world. Here at our feet is the Forum, thick set with ruined broken columns, triumphal arches, temples and palaces; and here the Senate, where Cicero poured forth his impassioned eloquence. Not far off rise the gray walls of the Colosseum, crowded with old and solemn memories. How they rang with the shouts and applause of thousands over the fierce struggles of gladiators, and the fall of innumerable martyrs among the early Christians! Close by are the ruins of the palace of the Cæsars, around which vines and flowers now cling in their loving embrace, and here the Tarpeian Rock, that witnessed the death of so many a victim flung down its steep sides. An hour among the ruins, and it was quite dark, and time to return.

As we had but a week to spend here at the farthest, we thought it best to have a guide in our constant employ, that we might spend it to the best advantage, and see the objects most worthy to be seen. Early in the morning, therefore, we had our carriage as usual, and started out for a survey of the city, first attempting to get a complete general idea, a map, as it were, in our own minds, both of the old city and the new, and afterwards taking in our way those particular parts which deserved a more careful attention. I believe we ascended each of the seven hills in turn, stopping here and there to enter some church or ruin, visiting St. Peter's and the Vatican, but rather to receive our first impressions, as we intended to devote much more time to them on a subsequent day. Thus one day soon passes, and night comes too quickly.

The next day we rode far out upon the Appian Way, passing that noble great round tomb of Cæcilia Metella, the exterior of which is still perfectly preserved, though it is no less than nineteen centuries old, and thousands of ruined monuments in this street of the dead, and coming to the Catacombs, the tombs of the early Christians, many of them as early as the first century. Into these we descended, bearing each a candle to light our dark and gloomy way. These Catacombs, deep under ground, cover many acres, and are of deep interest in many points of view. We were led through subterranean chambers, containing many passages where the persecuted Christians sought a resting-place for their dead. Many of these passages and chapels are covered with paintings and inscriptions. The places where we stood, though themselves deep under ground, covered many other passages and chambers still beneath us, and no doubt similar in their construction. It was one vast city of the dead.

We visited Saint Paul's, the largest basilica in Rome, said to have been built originally by Constantine the Great upon the spot where, according to tradition, the apostle Paul was beheaded. It was destroyed several times by fire, and the present structure is therefore new, and when completed will rival Saint Peter's for splendor and magnificence. The whole succession of popes, in mosaic, extends around the walls. Most of the Catholic sovereigns of Europe have contributed liberally towards the erection of this most elaborate church, and there are altars and pillars of malachite from Russia, presented by the Czar Nicholas, splendid alabaster pillars from the Pacha of Egypt, and many other interesting ornaments.

As we lingered on our return to see the old Circus Maximus, the scene of the races, I had an opportunity to see a little of peasant life upon the campagna. The kettle was put on to boil in a little hut, which we entered, near by, the fire being made of the dried droppings of cattle, which are carefully picked up and preserved for the purpose.

Next day we descended into the Mamertine prison, where Saint Peter was confined when the angel appeared to release him, and saw the rings of the chains used to fasten the prisoners to the gloomy walls. The baths of Titus, the baths of Caracalla, and the baths of Diocletian, also occupied a part of the day. These establishments were on the grandest scale, often covering several acres of ground, and adorned with the most splendid works of art. In the afternoon, on the Monte Pincio, the fashionable drive, one sees the most varied and interesting phase of Roman life. The grounds are most beautiful, adorned with many kinds of trees, and shrubs, and flowers. Fountains spring from marble basins, in the midst of clumps of acacias and pines, roses and laurels, while the statues of the great men of Rome, like Scipio, Pompey, Cæsar, Cicero and Tacitus, and the more modern Dante, Ariosto, Galileo and others, adorn the walks. This Pincian mount was once the garden of Sallust, and here stood the villa of Lucullus, and from a heap of ruins, Napoleon the Great transformed it into a most delightful park, from which we look down upon the Tiber, the temple of Vesta, and many other objects, around which cluster the crowded memories of the past.

"There goes the princess Colonna," said our guide, as he pointed to an elegantly dressed lady in her carriage. The cardinals were out for an afternoon walk, and many other high dignitaries of the church.

We mounted to the dome of Saint Peter's and lingered long gazing over this wide region, and then descended to the interior of the dome and tried the wonderful echo, where the slightest whisper can be heard on the opposite side, a distance of many feet. The Vatican contains vast collections of antique statuary, found among the ruins of ancient Rome, as well as the paintings of the great masters, but I cannot dwell upon them here.

The Pantheon is older than the Colosseum itself, and still retains its ancient splendor, though robbed of much that once distinguished it. This pagan temple was built by Agrippa, and presented by him to Augustus. Its walls are nearly twenty feet in thickness, and that accounts for their having withstood so well the great conflagration of Nero and the numerous others of a more recent date, during the invasions from the north. It stands now very much as it stood when the consuls, the emperors, and the scholars of ancient Rome beheld it, though one of the Christian popes tore down the thousand statues in brass which stood on the great circumference of the cornice and the brazen gates, to decorate Saint Peter's, and to cast into cannon for the castle of Saint Angelo. But more than two thousand years have tried in vain, with all the aid of the destructive elements and the ruthless hands of man, to destroy it.

The Colosseum has furnished the marble for many a palace of modern Rome, but it still stands the most impressive monument in the world, solemn and grand, eloquent and instructive in its beauty. The half of the great oval which remains rises to an elevation of a hundred and sixty feet, and there is enough of the interior left, though many parts are crumbled and rent, to give a good idea of its construction. Imagine a hundred thousand human beings, the rank, the power, and beauty of Rome, seated within the vast walls! When it was dedicated under Titus, the festivities lasted a hundred days, and ten thousand wild beasts, mostly brought from Africa, were slain there, together with captives and gladiators in great numbers. The ruins are now covered with grass and wild flowers, moss and shrubs growing in the crevices, and clinging to the walls outside, hanging pendant or shooting their graceful forms towards heaven. Very nearly three hundred different species of plants are found growing in the ruins of the Colosseum.

The tomb of the Scipios is close by the palace of the Cæsars, and after visiting that, we explored the ruins where the emperors of Rome once dwelt. These vast ruins are now partly covered and overgrown with shrubbery. I gathered ripe peaches and apricots among them, and plucked a most beautiful pomegranate blossom there. The century plant grows wild, and so does the fig, and I think some species of the cactus. Cicero once had a house upon this hill, the Aventine, so that he was a near neighbor of Augustus.

I cannot even allude to the many objects of interest for the stranger in Rome. Volumes would be required to give any adequate idea of them. But there is a certain class of objects which I should be glad, did my limits permit, to dwell longer upon. I allude to the many relics of the Holy Land which are pointed out by the devout guides, such as the stairs up which the Saviour walked when he went to the council, to receive his sentence from Pilate, and which are ascended now only upon the knees of the penitent; the well to which the woman of Samaria came to draw water, preserved in the cloister of St. John Lateran; the very table on which the Last Supper was eaten; the measure used to show the height of Christ, and a thousand others of a similar kind, but as I do not know on what their authenticity rests, I must pass them over.

I left Rome with regret. It had been so much connected with my early studies that I had looked upon it as a kind of

Mecca, to which I had longed to make a pilgrimage. But we were off again for Genoa, on our way to the north, and it was some satisfaction to feel that we should soon be under the cool breezes of the Alps.

It had been excessively hot and dry for weeks, with not a drop of rain to moisten the parched earth. Leaving Genoa early in the morning, we soon rose up from the level of the sea, among the hills and valleys. After passing the Appenines, the road runs through a level but highly cultivated country, abounding in luxuriance. The contrast between Lombardy and Southern Italy is very great. As soon as we got among the irrigated fields every thing was green and fresh, teeming with life.

"What crop is that?" asked my companion, one of the Smiths, pointing to a large field that looked a little like barley, in the distance from the railway.

"That! that is Italian rye grass, a native of this part of Italy, and one of the very best grasses known for cultivation on irrigated meadows. It produces the earliest of any, and will bear a great amount of forcing from liquid manures; and what's more, these people cut six, eight, and nine crops of it."

"Is that so?"

"That *is so!* So the books say. You know I'm a stranger here. But look there. They are cutting a crop now, quite green and low. How juicy that must be! Don't you remember they have a proverb in Spain relating to the irrigated meadows of Valencia? They say—

'In Valencia, the flesh is grass;
The grass, water;
The men, women;
And the women, nothing.'

But that don't seem to apply here, for the women appear to be more and to do more than the men. So don't let that proverb prejudice you against the girls of Milan, for we are rapidly approaching it."

As we neared Milan the evidences of the highest cultivation appeared in every direction, as far as the eye could reach. Water courses along by the sides of the railway and around each field, and tall trees line the highways. Not a fence is to be seen, but greenness and luxuriance on every hand.

And this is not for a mile or two around Milan, but for nearly the whole length and breadth of Lombardy and some of the adjoining provinces which we passed through, a hundred miles, perhaps, for after leaving Milan for Lonato, where we struck into the fields for a tramp to the battle-ground of Solferino, we passed through a constant succession of irrigated lands for eighty miles; and subsequently, in going west from Milan towards Turin, the same general system prevailed.

One feature in the landscape that surprised us was the entire absence of cattle grazing. On inquiry it was found that the whole produce of the permanent grasses and the clovers is cut for soiling cattle, kept mostly in stalls. They avoid the unevenness of surface consequent upon the treading of cattle, make more manure and economise it better, by the frequent addition of rufuse substances, and are enabled to keep far more stock on a given extent of land.

This irrigation of Lombardy had interested me so much for the last ten years, that I determined to learn what I could about it on the spot. As I made but bungling work of Italian, and found but few who could understand my French, it was an example of the pursuit of knowledge under difficulties. Still, not to be daunted, it was easy to get an idea here and another there, and putting this and that together it was hoped that some progress might be the result.

Never was water more obedient, or more under the control of man. It seemed as if trained to mind. An old woman would go along and stick down a board, and off the water would turn, without perversely attempting to work its way through the sluice-way.

Sauntering around the streets of Milan, gazing into shop windows, and wondering what a population of upwards of 175,000 could find to do in such a city, my eye rested on a small work on the very subject that was uppermost in my mind, a little treatise on the agriculture of Milan, prepared for the Italian Scientific Association, and, of course, as reliable as one could expect to find. It is the report of Devincenzi, and that part relating to irrigation may be condensed as follows:—

There exist in Lombardy two very different systems of agriculture, each of which is well adapted to the circumstances under which it is pursued.

In Northern or Upper Lombardy, including all that part north of a line drawn east and west through Milan, or say that part north of the railway to Venice, as far east as the Lake di Garda, the farms are small, and cultivated by a hard-working peasantry.

In Lower Lombardy, including all of Lombardy south of such a line, occur most of the extensive water meadows. As a general thing, the agriculture about great cities cannot be regarded as the type of that of the country at large, but that in the vicinity of Milan is an exception, and consists mostly of irrigated meadows, the land kept under tillage being very small in proportion.

These meadows are very ancient, but still in a very flourishing condition, the labor required being simply to regulate the water supply and keep the surface level, the grass being permanent, or that naturally produced by the soil. Those lying south of the city of Milan receive the sewage water and no other manure, and are cut seven or eight, and in many cases nine times in a year. Those in the north have a greater application of manure, and often the irrigation of spring water, and are nearly as productive as those south.

There is a class of watered fields called *marcite*, or winter water-meadows. They are watered every six or eight days in summer and are covered by flowing water in winter. The growth on them is so rapid that between November and March two or three crops are cut, and the cattle fed from them are not without fresh green fodder more than thirty or forty days in the year. These meadows usually let, in the neighborhood of Milan, from twenty-five to thirty dollars an acre. The water does not run to waste but is applied in summer to meadows and to all kinds of cultivated plants.

The system of irrigation in Lombardy has converted what would otherwise have been barren sand and unhealthy marshes, into productive meadows. It is really irrigation, drainage, navigable canals and motive power for mills so combined that one object or use does not materially affect or interfere with the others.

Lower Lombardy is peculiarly adapted to irrigation. It consists of an immense valley, and the lakes on the top of the hills at the north are admirable reservoirs for water, while the river carries off what is superfluous.

The size of farms in the province of Milan, which is a part of Lombardy, varies from three to five hundred acres. They are usually let on leases from nine to twelve years. On many of these farms the culture of rice is carried on to considerable extent, but confined mainly to the stiff soils. It is estimated that about a tenth part is kept down to permanent meadow, and about half of this is cultivated as winter meadow.

Spring water, on account of its warmth, is esteemed best for winter meadows. Where rice is cultivated, a nine years' rotation is commonly followed. First comes wheat, with red clover, which gives a rich pasturage in autumn. Then manure is applied the next year, and white or Dutch clover comes in spontaneously during the third and fourth years, and manure is applied both years. In the fifth year, Indian corn and flax occupy the ground. In the sixth year, also Indian corn, well manured. In the seventh, eighth and ninth years, rice is sown, the two last with manure. An acre will yield on an average from twenty to twenty-four bushels of wheat, or from fifty to seventy-five bushels of Indian corn.

Mulberries are seen growing in perfection, both in the permanent meadows and others, and thrive in irrigated lands. The hay taken from the meadows is used to feed working cattle and cows. The income of a cow is reckoned at from fifty-five to sixty dollars, not in the vicinity of Milan or near large cities alone, but generally over the district. The milk is used in making the celebrated Parmesan cheese, which is largely exported. Some butter is made.

The general rent of farms in the Milanese territory is ten or fifteen dollars a year per acre. The fertilizing power of water is very great, and farms capable of being irrigated rent far higher than those which have not this advantage. So much for Devincenzi.

As for the rest, it was easy to see that those lands which were so situated as not to be capable of irrigation, were no more fertile or productive than the same class of lands with us. As we stood upon the rising grounds, where the bloody battle of Solferino was fought, we could see many acres of dry and sterile fields, and look off over Mantua, the birthplace of Virgil.

Thousands of acres of the most beautiful irrigated plains were in sight, perfectly loaded with the crops of summer, and teeming with luxuriance. Down the dry sides of the hill on which we stood vineyards clothed the ground. The village itself, from which the battle took its name, is small, old, and unattractive. But the roads are good, excellent. From Lonato, where we left the railway, to Solferino, nine or ten miles, the road was superb. There were no fences on either side.

I spoke on a former page of the system of irrigation adopted on the farm of Alderman Mechi. Tiptree Hall is familiar, by name at least, to most farmers in this country. It may be well to allude to his system, for a moment, also, in this connection. There is this difference between his practice and the system of irrigation in Lombardy and elsewhere. He uses water as a means of diluting and carrying his manure to his land and crops. His is the application of liquid manure, the solid droppings of his cattle being as it were dissolved and washed by the application of a strong jet of water to the stalls, to a cistern not far off, from which it is forced through pipes, by steam-power, out upon the land.

The most of the irrigation here in Lombardy consists of the application of pure water to growing crops, generally to grass. The use of sewage water around Milan is of course an exception. It must be evident that the success of Mechi's system, as well as any other system of irrigation, will depend very much upon the character of the soil, whether light, porous and well drained, or heavy and stiff. On clay lands straw and other coarse manures are needed, not merely to add fertility or furnish food to plants, but also as a means of correcting and improving the physical texture of the soil. The straw itself becomes therefore an important part of the manure, and if it were applied without first having been used as litter, and becoming incorporated with other substances, it would still possess very considerable value on stiff lands. Water on such lands, unless they were exceedingly well drained, would be a damage.

So, too, it would depend somewhat on the crop it was intended to cultivate. Any crop like grass, where it is desirable to get a juicy, succulent growth, throughout its period of vegetation, will be improved by a large quantity of water, especially on a porous soil; but if the object is to cultivate a crop for its seed, we know it is better to have the land dry, after the plant has passed the period of blossoming.

The land, as already intimated, to which irrigation, in Lombardy, is applied, is light, free, much of it sandy, which, without the application of water, would be comparatively unproductive. All such soils have free drainage. They would hardly grow such a gross feeder as Italian rye grass without a great abundance of water, especially as this is a shallow-rooted plant, not striking down a deep tap root, and all such plants are much more liable than those of an opposite character, to suffer from drought. If the water applied could be charged with a fertilizing substance, as it is upon Mr. Mechi's farm, no doubt larger results would follow. The water, in that case, would be a carrier of manure, and the best possible one for light soils. We see, also, that the Italians are judicious in the selection of crops with the facilities they have for using water. Turnips and mangels are cultivated not merely for the sake of the food they furnish to sheep and other stock, thus increasing the supply of manure for other crops, but as fallow-crops,—that is, as a means of cleansing the land from weeds by the frequent use of the horse-hoe and the cultivation they get by other implements. To apply the system of irrigation to such crops would prevent these operations, and thus be fatal to these important uses of the turnip as a fallow-crop. There would be a loss of the advantages derived from the repeated weeding and stirring of the soil, and the large yield of many tons per acre would not compensate for this loss.

Mr. Mechi saves his straw from the manure heap, cuts it up by the use of steam, mixes it with other substances, and uses it as food for stock. And for all those soils, crops, and climates, where the application of liquid manure is adapted, this is a great saving.

No doubt the success of this system on grass land in well drained or free, light soils, in a warm, dry climate, is greater than it would be on any other crop, though one sees it often applied also to Indian corn and other crops. The crops of grass, under these circumstances, are often wonderful, and, if they were not too well attested by innumerable witnesses of the highest character, would be incredible.

A man from Aberdeen exhibited a model of a system of irrigation at the show of the Royal Agricultural Society at Battersea Park. It consisted of a system of pipes perforated with very fine holes, laid over the surface of the land at intervals of about sixty feet, more or less, according to the pressure at the main cistern. It is self-acting, and may be applied in the distribution of clear water or of liquid manures, in the form of showers. It will operate constantly, if necessary, both day and night. It is easy to see what facilities this would give in a hot, dry season. But experiments made in 1860 and 1861 show the most astonishing results.

The first year, 1860, from the first week in May to the first week in October, seven crops of grass were cut, making eleven tons of dry hay per acre. This was with water simply taken from a river. In 1861, from the last week in April to the first week in September, six crops were taken off, making more than nine tons, per acre, of dry hay. A light dressing of superphosphate, mixed with nitrate of soda and sulphate of ammonia, was applied after every second crop, to give the crop a push, and they kept the grass in full growth throughout the season.

The material of his pipes is composition lead, of a permanent and durable character, and claimed to be worth about ten dollars per acre as old pipe. The whole cost of mains, distributing pipes, and all, per acre, is about seventy-two dollars.

To me, previous to seeing this fertile country of Lombardy, made fertile wholly by its admirable system of irrigation, the results that I had frequently read of,—seven, eight and nine cuttings a year,—always appeared chimerical, but after travelling through the length and breadth of the watered district, I am prepared to believe that an enormous quantity of grass can be cut from it. Another thing has impressed me strikingly here, and that is, that the Italians understand the period at which grass should be cut to make the most of it, better than we do. I nowhere saw grass allowed to stand even into blossoming; it was cut in a very green and succulent state, when full of its sweet young juices. In hundreds of instances, perhaps thousands, I saw men and women, more frequently the latter, mowing grass less than six inches high, often less than four, and very often, and in many countries, cutting grass that our farmers would never think of cutting. So careful and so saving are they in all parts of the continent, that grass is cut very green, very often, and very close to the ground, almost universally. But they often apply a dressing of liquid manure immediately after cutting, and I saw it in innumerable instances carried out upon the backs of women, and applied by the slowest possible of processes, distribution by hand, often making an extremely offensive smell, to be sure, after it was first applied, but causing a wonderfully rapid start and growth. There are meadows near Edinburgh that produce some fifty, some sixty, and some even as high as eighty tons of green food per acre, so it is said.

I saw something of the sewage system of London, where ten millions of cubic feet a day are discharged into the Thames. It is estimated that it contains ingredients equal in fertilizing properties to a hundred tons of guano a day, capable of manuring twenty thousand acres.

On the way to Venice, the traveller is stopped at Peschiera, the first town of Venetian Lombardy, still under the power of Austria. It is strongly fortified, and beautifully situated at the southern extremity of Lago di Garda. The train is stopped, passports are examined with the closest scrutiny, and the luggage overhauled without scruple. It was something of an ordeal to one visiting the country for the first time, and understanding the language of the officials but imperfectly. But as soon as they were satisfied that we were not intending to take the city, but only to spend a little money, they appeared to rest easy and let us pass.

Venice is a peculiar city. It is well nigh out to sea, being built on many small islands. The streets are canals and most of the locomotion is by the gondola. It was a very curious change from the ordinary modes of travel, to step from the railway station into a gondola and find myself at once on the grand canal, gliding along so noiselessly and shooting into a narrower canal, till at last we reach the step of the hotel. Without the loss of time we start off from another door for a short stroll, and soon find ourselves in the splendid square of Saint Mark. It was just in the edge of evening and the people had begun to assemble to hear the music of the fine Austrian bands that play here every evening for the gratification of the people. It was the finest music we heard in Europe; so sweet, so thrilling, that we could have listened to it for hours, as in fact we did, till it was quite time to return to our quarters.

Early in the morning, our guide engaged, we took a gondola and started for the exploration of the city, its palaces, its churches, its workshops and its canals. I soon pointed out the Bridge of Sighs, from my recollection of it, and found that I was right. A day was spent in these investigations and in visiting the Doge's palace, in whose dark and gloomy cells many and many a victim was confined, never again to see the light of day. The Bridge of Sighs crosses a canal from this palace to the prison.

The next day we made an excursion to the Lido, some two or three miles out, at the mouth of the harbor. It is a long bar of sand extending six miles in front of the city, and perhaps a quarter of a mile wide, and is about the only part of Venice where any cultivation is practicable. After a most refreshing bath in the Adriatic, we returned to our gondola and rowed to an island occupied by the Armenian convent, and were shown over it by a gentlemanly and obliging monk, who pointed out the room where Byron used to come to study the Armenian language. We sat down in the chair that he occupied, saw other interesting relics of this strange man, and the printing presses, nearly the only ones which are used in printing this language, and returned to the city.

During our whole stay of four days in Venice, we saw no living animal, except down on the Lido, where I saw a yoke of oxen. Not a horse, not a cow, not a dog, not even a cat. Every thing was still and silent as the grave. I believe there were some six horses kept in the city for military purposes about the arsenal.

On our way back to Milan we passed the night at Verona, where the house of the Capulets and the tomb of Juliet, and many other objects of interest were pointed out. The immense amphitheatre here is in a better state of preservation than most of those we saw in other cities of Italy, and gave us a good idea of the internal structure of these places of amusement, so common among the ancients. After looking again over Milan, we took the train for Lake Como, some thirty miles north. Como is one of the loveliest of the Italian lakes, and we saw it under favorable circumstances, having ridden some miles along its shore and sailed across it, but we had not long to stay. The windows of the hotel looked directly out over the lake, and a pretty little balcony gave us a still more extended view. Garibaldi held this town some time, during the last war with Austria, which was ended so unfortunately for Italy by the peace of Villafranca. We saw written about upon the buildings, "Brothers, Rome and Garibaldi," which seemed to indicate the popular feeling for this leader and which corresponded with what we had found in the southern parts of Italy. Here occurred the only shower we had then seen in that country, accompanied by sharp thunder and lightning. It was much needed, and the bracing air which followed was quite refreshing.

The middle and north of Italy are very nearly in the latitude of Canada West. The latitude of Milan, Venice, Genoa and Nice, where winter is scarcely known, corresponds precisely with portions of Canada West. Montreal, in Canada East, is in latitude 45° 31′, and Venice in latitude 45° 26′, a difference of only about six miles. A line run from Venice, directly west, would pass quite near to Montreal, and leave Toronto a hundred and twenty miles to the south. Toronto is within a mile of the latitude of Nice, and nearly as far south as Leghorn.

And yet the mean temperature of the coldest month at Venice is only 35½° of Fahrenheit, while that of Montreal is 13°. The difference, therefore, is in the winter and summer. In the one, the winter is extremely cold and severe and the summer hot and dry, in the other, the winter is extremely mild and the summer comparatively equable.

Returning from Lake Como to Milan we pursued our way westward through the monotonous plains of Piedmont. The early part of the way from Milan lies in the Milanese territory, and is still a part of Lombardy. The battle-field of Magenta is at a railway station not far from Milan, and the evidences of the hard fight still exist upon the houses, some of which were riddled with balls. The land is level here, and the fields stretch off almost as far as the eye can reach. At the time of the battle they were covered with grain, so a gentleman sitting by my side asserted, and the forces of the two contending armies made terrible havoc with the growing crops.

The next prominent town is Novara, once a part of Lombardy, but now in Piedmont. It is old and prosperous, prettily situated on a rising ground, and commanding a grand and beautiful view of Monte Rosa and other ranges of the Alps. A half hour's delay gave but little opportunity to see the city, but it so happened that in September, on my second visit to northern Italy, I visited it again, with more ample time for observation. The ancient cathedral, built in the early Lombard style, is called one of the oldest and finest in Italy. Its magnificent altar is adorned by works of Thorwaldsen, while its beautiful mosaic pavement is still in a state of preservation, and indicates the original splendor of this structure.

In the neighborhood of Novara and Vercelli, another prominent old city on the way to Turin, the system of irrigation, a part of the old Lombard works of the fifteenth century, still exists, and is among the finest of Piedmont. Vercelli lies near the left bank of the Sesia. Like Novara it possesses an ancient Duomo or cathedral, where are preserved a manuscript copy of the gospels made by St. Eusebius in the fourth century, and another of a book of Anglo-Saxon poems obtained in England during the reign of King John or Henry III.

This part of Piedmont is one vast plain, which made it comparatively easy to lead the waters from the streams at the foot of the mountains. I saw at Ivrea the starting point of the canal made centuries ago under Amadeus VIII. to supply water for the irrigation of a large extent of territory in this neighborhood. The works, though ancient, are remarkably efficient. In this part of Piedmont the culture of rice has been carried on to considerable extent, but it is regarded as very unhealthy, the average life of those who occupy the low wet lands which alone are suitable to this industry, being only thirty years.

Through the influence of Count Cavour and his brother, who owned large estates in the irrigated plains of this section, a board of water commissioners was established to regulate the use of this element, so indispensable to success in this country, and to settle all disputes and questions arising under the system. But with the exception of these localities, irrigation is not common in Piedmont. With abundant means to introduce the system, it does not exist on a large scale, except where the works for it were made many years, perhaps centuries ago. But the careful peasants who live in the valleys of the Alps, and cultivate elevated situations, avail themselves often of the existence of a brook in the neighborhood, and lead the water round in trenches often great distances, upon their lands.

These plains are not very thickly peopled. The lands are rented generally "at the halves," and the owners spend but very little time upon their estates, often not more than two or three weeks at harvest. The peasantry are generally very poor, the farming often slovenly and careless, as if those who work the soil had little or no interest in it, which here on the plains is the case. Those who have capital sufficient to stock their farms can make a better bargain than others, but often the landlord has to furnish land and capital also, while on the irrigated lands rented in this way the laborer has but a third instead of half the produce. Among the valleys of the southern Piedmontese Alps, a few miles to the north of the plains, the love of land is very strong, and the poor peasant clings to it, unwilling to sell at any price, while the principle of minute division, originating here also in the great French Revolution, prevails to a great extent; but lower down, the holdings are somewhat larger, there are less independent owners, the country is less healthy and less populous. It is manifest that there is little interest in agriculture. It is not fashionable here. More than this, country life is not fashionable. The wealthier classes prefer the city. Every thing is left to laborers who are poor and ignorant, and this part of Italy, with one of the finest climates in the world, with natural facilities for production unsurpassed, languishes for want of the fostering care of those who might make it the garden of Italy, the paradise of Europe.

The deprivations and hardships of a large portion of the peasantry of Piedmont are scarcely credible. Whole families are often obliged to go from one year's end to another without tasting meat oftener than once a fortnight, some not oftener than once a month. Their food consists chiefly of Indian meal, made into a kind of polenta or porridge. Fuel is so scanty, and so difficult to obtain, owing to the want of forests, which were long since stripped from every hilltop, that they are compelled, during the winter, which is here rather severe, to huddle together in low, dirty sheds, with their cattle, where they suffer for want of air, and from damp, suffocating exhalations. They have no coal, and as some fire must be had for cooking, they are compelled to pick up whatever they can lay their hands on. They have little respect for the rights of property. The stakes from vineyards walk off mysteriously. Wooden fences are out of the question, and hence there are no division fences. Poaching on the land of others is so common, that it may almost be said to be universal. If a man has a fine yield of grapes in his vineyard, he is obliged to gather them before they are ripe, when they make but a poor quality of wine, because poor wine is thought to be better than none at all, which is, no doubt, a mistake.

Speaking of wine, by the way, reminds me to speak of the quality of very much of the ordinary wine of the country. Good cider vinegar, a little diluted with water, "half an' half," is a delicious beverage compared with Italian *vin ordinaire*, though perhaps it might be a little more "heady." I could never like it, though sometimes compelled to drink it, as good water is not often to be found there.

Strange to say, with vineyards all about him, the laboring man in Piedmont is compelled to drink water throughout the winter, for want of vessels and casks to keep wine in, to such poverty is he often reduced. The houses of the peasantry are not generally situated on the land they cultivate. They are huddled together in dirty villages, and the laborers often have long distances to travel to and from the scene of their daily work. How can agriculture be expected to flourish under such circumstances?

The hotels in these villages where the traveller is compelled to stop, are not, of course, very attractive. Man and beast are put under the same roof. This is almost universal among all classes in Italy, except in the first class hotels of the larger and more frequented cities. Every thing about the entrance of hotels in smaller towns is forbidding, and every thing in such confusion and disorder, that it is rare that one is able to find the entrance at all without inquiring. Think of a stable with its manure heaps, its noise and its stenches, stuck down before the door of a hotel, or under the same roof, as it is in most of the houses! But there is no accounting for tastes! They doubtless like that style of civilzation, or if they do not, there is neither vitality nor enterprise enough to get up a revolution in their domestic organization. They say it is want of money, but the young men of family lounge about the cafés in idleness without making an effort.

In the neighborhood of Turin, as elsewhere, the uncertainty of being able to gather the fruits of one's labor and expense, is such as to deter many from attempting any improvements, and not a few who have gone out of the city to build their country villas have given them up in disgust at the annoyances to which they were subjected in the loss of crops and fruits. I wish we could say that we are exempt from this source of annoyance, that we could have a reasonable certainty of being able to enjoy the fine pears and other fruits that we take years of patient care to produce, and it is but a poor consolation to find other people suffering even worse than ourselves.

Turin is a beautiful city, situated on the Po. The sidewalks in many of the principal streets are covered with beautifully arched colonnades; the architecture of the city is rather attractive, and much of it elegant. As the king, Victor Emanuel, and the royal family were out of the city, we had the satisfaction of seeing nearly the whole of the palace, including the private apartments of his majesty and the rooms of various members of the family. This was a privilege accorded to us as Americans, I suppose, as there were many others who were refused admission, while we, explaining our position to the best of our ability in French, were not only admitted, but the polite attendant took pains to explain and point out a great many objects of real interest, which space does not permit me to dwell upon.

We visited many of the churches also and the senate chamber, full of the most superb paintings, many of them by Rubens. Since the constitution was given to Piedmont, a much larger degree of liberty of conscience and political action has been enjoyed than in any other part of Italy. The Waldenses, a long persecuted band of evangelical Christians, were allowed to build a church in Turin, which they occupy unmolested. In our walk around the city we came across a large number of women washing clothes, leaning over a little dirty running brook, in a most "back-achy" position. It was a sight we often saw in France, Italy, Switzerland and Germany. In many places they have to pay for even this privilege, but I did not learn how it was here. We didn't think it worth much in our "account of stock."

And now for the first crossing of the Alps. The railway takes us to Susa, in Sardinia, only thirty-two miles from Turin, when we are at the foot of Mont Cenis. Getting tickets in the heavy lumbering diligence, behind half a dozen sturdy mules, we began the slow ascent about three o'clock in the afternoon. The road is superb. The muleteers, with a loud crack of the whip, constantly urge on the team, and we rise higher and higher till the prospect begins to be grand and beautiful, as we wind up the sides of the mountain and look back upon the sunny valleys of Italy. The air is cool, bracing and exhilarating. Mountain torrents come thundering down at our feet, or forming little cascades, which glittered like spangles in the sun. The luxuriant vegetation of the plains ceased, and the trees dwindled down to shrubs, while little Alpine flowers lined the roadsides, and little ragged girls came running along by the side of the diligence with wild strawberries to sell.

At the approach of sunset I jumped out and ran up the side of the mountain to strike into the road above, so as to be at the top in season to see a sunset on the Alps, but still beyond there were peaks piled on peaks, covered with snow, glittering with the last lingering rays of sunlight. Here on the very top of the pass the farmers were haymaking, almost up to the line of perpetual snow. They usually mow here by moonlight. There is a hospice at the summit for the accommodation of travellers, and in front of it a pretty little pond, from whose pellucid waters it is said the finest trout are taken. After a change of team from mules to horses, we started down at a rapid pace in the light of a clear full moon, and by noon of the next day we were quietly seated in Geneva.

This was the first of Switzerland, with its mountain scenery, its bracing air, its freedom of thought and action. According to our usual custom, we soon had a carriage and were driving about the neighborhood, visiting the spot where the Rhone and the Arve unite their waters, and other objects of interest to a stranger. The French language is spoken here pretty universally. Lausanne, on the lake of Geneva, is one of the prettiest towns in Switzerland. Here we stopped a night and part of the next day, in the house occupied by Gibbon, and where he wrote his masterly work, the "Decline and Fall of the Roman Empire." At Yvydun, having occasion to stop a few hours, I visited the old castle used as a school by Pestolozzi. It is in a tumbling down condition, but the old custodian was enthusiastic in his narration of its past history, and of the great teacher who occupied it. This place is at one end of the lake of Neufchatel, around whose shores we passed, at the foot of the Jura, on our way to Berne.

The confederation of the Swiss cantons was modelled after our own. The central or federal government, having Berne as its capital, is aiming to bring about a more completely harmonious union, a more centralized power, by various national festivals and otherwise, but the doctrine of "state rights" has led to much contention by words, which, at one time, came to an open rupture in the war of the Sonderbund, which was not put down without considerable bloodshed.

Party feeling often runs high in the cantons, and it is evident that with the blessings, they also have the natural evils of a free, republican, representative form of government. Conservatism is overridden by young Switzerland, as by young America, and much complaint is heard that the ablest, the best and the wisest citizens have to stand aside, for the pushing, the bold and the unprincipled; and the management of affairs is often in the hands, it is said by some, of those who don't know any more than they ought to. When the people are properly educated, no doubt these evils will in time correct themselves.

Berne is a quaint old city, founded in 1191. Bears, from which it was named, are its tutelar deities, or its patron saints. An image of a bear, cut in stone or wood, meets you at every turn. From the lofty terrace, a magnificent platform planted with trees, around the cathedral, the view of the Oberland and the Bernese Alps is one of the grandest and most beautiful in Switzerland. The river Aar almost encircles the city. Walking down one of the principal streets, with its lofty colonnades projecting out from the houses over the sidewalks, we came to an old arched building containing a curious and complicated clock, built in the fifteenth century. As it was nearly time for it to strike, we stopped a few minutes to witness this phenomenon. A cock began to start up and clap his wings, and crowed three or four times. Then the four evangelists start out, each in turn, from their niches, and each strikes the quarter hours upon a bell, with a hammer which he holds in his hand. A little door opens and a strange procession files out, turning in a half circle around the base of the clock, and entering another door just as the last stroke of the bell is sounded.

Farther down the street, near the banks of the river, live bears are kept in pens, at the expense of the city. There were two old ones of enormous size in one apartment, and four young ones in another. They furnished a constant source of amusement to old and young. Not long ago an Englishman fell down into the pen, when the bears immediately attacked him. A great cry was immediately raised, and the gens d'armes were very soon at hand, but as they refused to fire upon the bears, the poor Englishman was killed before he could be rescued. His friends immediately came over to complain that he was not saved, and when the gens d'armes were asked why they did not shoot the bears, and thus save his life, they replied that "Englishmen were too plenty already, but bears were getting mighty scarce."

The characteristic of Swiss farming may be said to be extreme care in minute details. Every ounce of manure is saved and piled up for a compost, often right in front of the house, where it receives a thousand waste substances from the kitchen. Nothing is lost that can add to the fertility of the soil and increase the crops. Children perambulate the streets to pick up all the manure they can find. Then irrigation is pretty extensively applied wherever it is practicable. It was practiced in Switzerland as early as the fourteenth century. I saw many instances of it. Some of the irrigated meadows are very productive, generally producing two crops of hay in addition to an early cutting of grass, often as early as April, to feed out to cows, mixed with dry hay. The first hay crop is cut the last of May or the first of June, the second in August, and the grass is cut the fourth time at the end of September or in October. I saw it cut in innumerable instances late in September, when it was, I should think, not over four or five inches high. The water is let on usually in March, and allowed to flow over the land two or three days, when it is turned off to irrigate some other piece, and after a week or fortnight, according to the looks of the grass, it is again turned upon the first piece for the same length of time, and this alternate flowing is continued at intervals through the season, that is till it becomes impracticable from frost and snow. The irrigation of October, November and December, is thought to be most beneficial to land. When the streams are swollen by the melting snows. they are not let on. After March the land is usually left dry rather longer intervals than in the fall.

After the first grass is cut for green fodder in April or the first of May, the water is immediately turned on for two or three days, and so after the first hay crop in June and the second in August. The last crop cut in September or October is also used for fodder and not made into hay. Cattle are never turned upon irrigated meadows. Thus four crops of grass are cut, and in very good seasons five. They prefer soft or rain water, to that from the melting of snow and the glaciers. If allowed to flow over too large an extent of land its value is diminished. Many will not irrigate during the full moon as they say the grass is weakened and the color affected. Careful experiment, they say, has proved this. In very hot weather in summer the water is not left on by day but only during the night. Water which will dissolve soap is good, and the water of good trout streams is excellent for the purposes of irrigation. The growth of water-cresses and other plants at the bottom of a stream is another favorable indication of the quality of the water, but brooks that deposit any calcareous substance on their banks or where petrifactions are found are bad. To make an even surface the subsoil is frequently removed with great labor, the surface mould replaced, and what is taken out allowed to have the air, freeze and thaw for some months, when it is mixed with the manure. They know the subsoil possesses very considerable absorbent properties taking up ammonia from the atmosphere and really making, after some time, a pretty good top-dressing.

Those who adopt this system of irrigation think they cannot irrigate too much. The greater the fall, the quicker the water runs, the quicker the grass grows. They generally keep irrigating as late as possible till there is danger of freezing solid. Fields which cannot be irrigated are top-dressed with solid manure in the fall, and if they havn't enough to go over the whole they apply liquid manure while the snow is on the ground. In the farm-yard are tanks which collect all the liquid, which is pumped up and sometimes carried by little troughs to the water-courses, sometimes carried out in carts and spread by hand. They often set a pump down into the centre of the manure or compost heap, and so pump up the drainings every morning over the heap till it is saturated. Potato-tops, weeds and whatever other rubbish is thrown on, thus get a frequent soaking. When shall we learn to preserve and treat our waste substances with such laborious care?

In company with the Hon. George G. Fogg, the American minister to Switzerland, we visited Thun, sailed the length of its beautiful lake, and stopped awhile at Interlaken, then began our ascent to the Bernese Alps, to Grindelwald, up among the glaciers. It was a grand and curious sight, the green luxuriance, the deep-tinged flowers, Alpine harebells and many others, growing just at the verge of eternal ice moving down constantly but slowly and imperceptibly from the higher Alps, in one vast jagged stream. Now and then we hear the thunder of some falling avalanche echoing from mountain to mountain, and then looking up, innumerable little châlets extend as far, almost, as the eye can reach, now scattered round as if with some regularity, now an isolated hut on some projecting platform of green grass. Thousands of cattle are seen in various parts of the mountains, and the distant tinkling of bells, sometimes so distant that we can scarcely distinguish the sound, gives an unspeakable charm to the whole Alpine scenery. These cattle are often perched on heights which seem to be quite inaccessible, and though they do not appear to be so very far off, they are really some miles away from the villages which we pass in the valleys, and from which they had ascended.

The following account of the cattle upon the Alps is translated mostly from the work of Tschudi, *Das Thierleben der Alpenwelt.* I need not say that I saw many herds of which this is a correct picture, upon the mountains, in my ascent of the great St. Bernard, at the Grindelwald, on the St. Gothard, in the valleys and in the mountains of the Ticino, the Reuss and other ranges of the higher and lower Alps.

The domesticated animals of the Alps form the living ornament of the landscape, otherwise oppressive in its grandeur. The wild animals are by far too scattered to do this. The mountains would lose half their charm if the small huts, the marks of man's supremacy, were wanting in these most savage wastes. They are sheltering roofs to which he drives his flocks, while the smoke curls up from his hearth and his merry song resounds from the rocks.

The traveller in the Alps knows well the dull melancholy which hangs over the rocky pastures in the fall, when men and herds, horses and dogs, fire, bread and salt have left the heights for the valleys; when the châlets are deserted and fastened up, and it seems as if the ancient spirit of the mountains had thrown his gloomy mantle over his whole domain. No sound mingles with the rumbling of the glacier, and the dashing of the ice-water for miles around, none but the scream of the hungry bird of prey or the whistle of the marmot as he rushes past. The ground eaten bare, except where a few small patches of untouched grass indicate the presence of poisonous herbs, has lost its pretty hue; reptiles occupy the drinking troughs, now filled with mud, and some late butterflies flutter about with torn and faded wings, while the melancholy chorus of frogs seems to mock the herdsman's summer song.

The wild regions can only be brought under cultivation by means of the peasant's dear cattle, which have a greater influence over the human family directly connected with them, on their fortunes and their habits, than the grandest revolutions of the political world. His cattle are a part of the cowherd's own being, more dear to him than the fields to the farming peasant, or the wares to the merchant. He lives by and with them; they are his wealth, his happiness, his familiar friends as well as his means of subsistence. If he talks of his "*Habe*," or possessions, he means by it both wife and cattle.

It is not easy to state the exact vertical extent of the Alpine pastures, as it depends on local circumstances. We may assume, in general, that the soil is ordinarily tilled for meadow land and other purposes as far as four thousand feet above the level of the sea; in the most fertile parts of the Rhaetian Alps the average rises to about five thousand feet. From this level the Alps, properly so called, begin, those which are used merely for summer pastures. They consist of tracts of grass which are sometimes of extraordinary extent, the pampas of Switzerland, which stretch away as high as the nature of the mountain permits. We can hardly fix the mean upper limit of the Swiss cow pastures higher than six thousand five hundred feet, since from that height torn Schratten fields, precipitous slopes, and points of rocks, extend to the line of snow. The sheep pastures also embrace this district, and extend, on an average, to about seven thousand feet; a few scattered oases, used in very fine seasons, reach as far up as eight thousand five hundred feet, and on Monte Rosa, nine thousand feet.

The importance of cattle breeding as a branch of industry in Switzerland, may be seen in the statistics, which give the aggregate of cattle in the country as 850,000 head, of which 475,000 are cows, 85,000 oxen, and 290,000 heifers. The condition of cattle in the Alps is generally far from prosperous. In many places there is a want, and in some a total want of proper stabling. The cows roam over the pastures, grazing on the stunted grass; and a sudden snow storm in the spring or fall drives the herds together in front of the sheds, which scarcely afford them shelter, and where generally, the cowherd has not so much as a handful of hay to offer them. During a cold rain they take refuge beneath the rocks in the forests, and there they fall off very much in their milk. The cows often calve at a distance from human aid, and at evening return to the hut with a full bag and a bouncing calf.

But the result is not always so happy. Proper sheds have lately been erected in some cantons, but the reader should not form a very favorable idea of the general life of the handsome, shining, broad-browed cattle of the Alps. The same cowherd who in the valleys watches over his animals with tender solicitude, will frequently not be induced to put up the simplest shed on the mountains to shelter them from the storm, or to protect their fodder and keep it free from weeds and stones.

But however badly housed, the cattle really enjoy the season on the Alps. When the great bell, which always goes with them on their journey to and from, is brought down in spring, a general excitement prevails; the cows all get together, low and frisk about, recognizing the signal for the approaching migration. Their spirits are often overflowing during the march, and those left behind in the valleys often follow the rest of the herd of their own accord to the distant heights. In fine weather it is indeed a glorious life for them up there. The bear's-foot, motherwort, and the Alpine plantain, afford them wholesome and palatable feed. The sun is less scorching than down in the valleys, and there are no gad-flies to disturb the young in their midday drowse. Instead of the ill-ventilated stalls, they breathe the pure fresh air, while constant motion and natural diet keep them in sound health. Stall-feeding, notwithstanding its many advantages, lays the foundation of many diseases, to which Alpine cattle are not subject naturally.

Cows on the mountains are thought to be more active and intelligent than those raised in the valleys. Their life is more natural and their instincts more fully developed. An animal left very much to itself is more on the watch and shows more memory than one which is always tended. The Alpine cow knows every shrub and puddle, knows where to find the best patches of grass, the time of milking, the call of her keeper, whom she approaches with confidence, and knows when to return to the hut. She scents the approach of a storm, watches and protects her young, and is careful to avoid dangerous places. In this last, however, she does not always show judgment, as hunger will sometimes lead her too near a dangerous patch of rich grass, and walking on loose soil, the ground sometimes gives away, and down she goes. If escape is hopeless, she drops to the ground, shuts her eyes, and gives herself up to her fate, sliding down over the precipice, or if stopped by some overhanging root, waits the cowherd's help.

One of the singular traits of the Alpine cattle is their ambition, and the strictness with which they maintain the right of precedence. The bell-cow is the strongest as well as the prettiest of the herd, and never fails to take the first place in the march, and no other ventures to step in before her. The animals next in strength, the aristocracy of the herd, follow. The bell-cow, fully conscious of her power, leads off to the shed and has often been seen when she has lost her rank, and been deprived of her bell, to pine away with melancholy. If a new cow is added to the herd, she has a duel of horns with each of her new companions, and takes her rank according to the result of the fight. If two animals are of equal strength the struggle is obstinate.

The cows on the mountains display great courage in defending themselves from the attacks of beasts of prey, and especially bears, which are plenty in the Southern Alps. In calm, fine weather, they can hear the light step of these animals at a considerable distance, and hurry to the sheds bellowing loudly. If tied, they rattle their chains constantly, till the herdsmen are aroused to the danger. The bear always tries to pounce upon them from behind, for the half-grown heifer will defend herself with her horns if necessary. If the bear succeeds in falling upon a cow, and begins to devour her, the scattered herd quickly rushes round and watches the process, keeping their horns low, snorting and bellowing from time to time, as if they would like to pitch into him. The bear, it is said, will not stop to finish his meal in this case, and will not venture another attack. During a long rain or thick fog the scent of the cattle is not so acute, and instances are known of bears, lurking close to the huts, attacking heifers and devouring or carrying them off without alarming the rest of the herd. Notwithstanding the familiarity of the cowherd with his cattle, and the alacrity with which they answer his call, there are, almost every summer, times when utter anarchy reigns among the herds, and he hardly knows how to keep them in subjection. This happens during storms in the night, which are hours of great anxiety and terror to all the inhabitants of the Alps.

The cows, tired with the heat and labor of the day, are, perhaps, enjoying their first repose in the vicinity of the huts and herdsmen, when the horizon is suddenly lighted up, and, for a few minutes, the neighboring snow fields appear as if overflowing with molten lava. A heavy mass of clouds lowers over the mountain peaks, a few light flashes chase each other from the west in quivering succession, while a deathlike stillness reigns in the distant valleys. The cows wake up and become restive. Hot breezes sweep through the cliffs or rustle gently between the rhododendrons and low mountain pines. Soon the glacier streams spring into life; a hollow rumbling is heard in the distance; the upper currents of air meet and struggle, and the lightning becomes every instant more red and vivid as it plays around the loftiest peaks. Then the cows rise, the bell-cow bellows and gives the signal to march, and in a short time the whole herd is collected around the châlet. It is oppressively hot and a few drops fall on the roof, beneath which the cowherd is still slumbering quietly. Suddenly a lurid flash blazes out from the nearest cloud, followed by a loud clap of thunder.

Flames burst from all the surrounding clouds, peal follows peal and torrents of hail descend upon the pastures. The terrified animals bellow loud, and run with tails erect and eyes shut, in the direction of the tempest. The herdsmen now start up half naked, and throwing their milk pails over their heads, hurry out to the scattered herd, shouting, coaxing, cursing and calling on the Holy Virgin. By and by a part of the herd is collected, the winds drive away the clouds, the hail turns into heavy rain, the cows stand round the hut up to their knees in mud and water, and the distant thunder reverberates at intervals from rock to rock ; but, alas, one or two of the finest cows lie palpitating and half crushed at the foot of some precipice.

Instances of such calamities occur every season. On the 1st of August, 1854, ten head of horned cattle, with the lad who tended them, fell over the cliff in a storm and all were dashed to pieces. This was in the Werdenberg Alp.

If a storm is expected, the cowherds take care to collect the cattle beforehand. They present a singular appearance when drawn up in rank. The trembling animals stand in a body, with staring eyes and downcast heads, while the herdsmen go from one to the other encouraging and coaxing each. When this is done, however violent the thunder and lightning may be, and however heavy the hail may pour down upon them, not a cow will stir from the spot. The poor, good-natured animals, appear to feel safe from harm if they can only hear the voice of the keeper.

Another kind of disturbance sometimes takes place, the nature of which is less known, and consequently more difficult to explain. If, when a cow dies or is killed in the Alps, any vestige of the body is left on the ground, the spot becomes the centre of a general battle-field. A cow which may have been grazing at some distance, is sure soon to find its way thither, showing every sign of excitement, to run about the place, scraping and lowing, and digging up the soil with its horns, as if mad. This is the signal for a general gathering of the herd, and a battle of horns begins, the violence and obstinacy of which can hardly be imagined. In spite of the utmost exertions, the fight terminates not unfrequently in the death or serious injury of at least one or two of the number. Even if the offal has been carefully removed or deeply buried, not one of the herd will cross the spot without manifesting the greatest uneasiness.

The bulls which are tame and good natured can be kept in the lower and more frequented pastures, but in the higher Alps very wild and dangerous animals are often to be met with. They are compactly built—their thick heads are covered with curly fore locks, and their general appearance is proud and defiant. A stranger visiting these pastures, especially if he have a dog with him, will attract the observation of a bull a long way off, and if he has a stick or a bit of red cloth about him, the bull becomes infuriated, and he is in great danger. He must run for the hut, or get behind a tree or wall, for any attempt at defence is useless, and the bull would sooner be cut in pieces than retire from the contest. The herdsmen rarely expose themselves to such attacks, but we once saw one, with astonishing presence of mind, seize a raving bull by the horn by the right hand, and strike him on the mouth with his left; then catching hold of the tongue he gave it a twist, and whirling the animal round with the strength of a Hercules, threw him to the ground. He never afterwards ventured to attack a man. The mountain cows seldom attack men, but they often show the most violent antipathy to strange dogs, and they will sometimes unite and wage battle with the enemy, who always finds it best to put his tail behind his legs and run away.

The value which the Swiss cowherd sets upon the beauty of his cows is well known. But there are no generally recognized principles of taste in the selection, and the points of beauty vary in the different cantons. The Bernese peasant likes a red or speckled cow, the Schwytzer rather have a dark chestnut color. In the Simmenthal a thick bull head is the style, and in the Entlebucth a fine feminine head is liked better. It is curious to watch a cowherd get enamored with the beauty of a cow. How eagerly he bids for a handsome one, and how loth he is to part with one. This has cost many a man his whole substance, while too little attention is paid to more important points.

The day of migration to the Alps, which usually takes place in May, is the most festive season of the year, both for cattle and herdsmen. In many valleys the custom of celebrating the anniversary of the patron saints at this season still prevails.

Thus the inhabitants of Grindelwald keep the feast of St. Patronella, and the Vallaisans that of St. Theodolf, who made the devil carry a consecrated bell over the Alps to Rome, and in whose honor the pass of St. Theodolf was named. Lofty and dangerous as it is cows still graze upon it.

Each herd, as it marches to the mountains, is accompanied by its own bell cow. The great bell, worn by the handsomest cow, trimmed off with gay ribbons and a bunch of flowers on her horns, is often more than a foot in diameter. The cowherds take great pride in these bells. With three or four of them, all in harmony with each other, and smaller brass bells chiming in between, they ring themselves in, from village to village, on their way. The train is preceded by a boy clad in a clean shirt and yellow breeches; the cows, with milking stools tied between their horns, follow in file, and are sometimes themselves followed by calves, and a few goats bringing up the rear. Then comes the herdsman himself, with a horse which carries the milking traps, bedding, covered with bright-colored oil cloth. Now the "Ranz des Vaches" echoes through the mountains. The melody is a series of lengthened trills, notes now abrupt and now protracted. There is a simple, wildly melodious combination of tones, often dwelling on the bass note and abruptly rising to the treble. With this melody the herdsman calls his cows and greets his comrades. It is a means of holding distant conversations on the mountains.

The day for the return to the valley is a sadder one for both man and beast. The social union of the flocks breaks up. Some are restored to their different owners, and return to their usual winter stalls. In the Upper Engadine, where good shelter is required against nine months of cold, they are kept in subterranean stalls, under the houses. Others are sent from the east of Switzerland into Italy. The native cattle dealers buy them to sell again, or the drovers come up from Lombardy, or other parts of northern Italy, and select out the best looking animals, for which they have to pay a good price. Great droves of these cows, from the Appenzell and other sections, cross the St. Gothard, the Splügen and other passes every fall, on their way to the south.

The cows about Berne are generally of a dun color, said to make exceedingly good working oxen, but their strong points are their dairy qualities. The Simmenthal race is large, spotted, and rather coarser than the Bernese, but still good milkers, and, no doubt, of hardy constitution.

Many of the old houses that we pass beyond Interlaken have some sentiment from the Bible or the poets written over the door in old German letters. The language almost universally spoken in Berne and all this part of Switzerland, is German. I left the foot of these vast mountain ranges with regret. The Yungfrau, the lofty Eiger, the Schreckhorn, the Faulhorn, the Wetterhorn, and other peaks, covered with eternal snow and ice glittering in the sun, and piercing the heavens in their height, are unspeakably grand and impressive. But our world of action is on a lower level, and we must come down into the realities of life.

I am indebted to the American minister, Mr. Fogg, for most of the following information in regard to the military education of the Swiss people. This branch of the studies of the young is regarded as of the most vital importance to the safety and the stability of the republic. Theirs is a government of the people, and the sacrifices they make to educate themselves in the art of war show how jealously they guard their liberties by being always prepared to defend them.

What an advantage the government of the United States would have possessed at the outbreak of the present devastating war, could it have commanded the services of a people all of whom had been trained, from their youth up, in military tactics, and to have called to the service the thousands of horses which its exigencies required, all trained to the evolutions of the field and accustomed to the din and noise of war.

In Switzerland all the able-bodied men between the ages of nineteen and thirty are required to receive a certain amount of military instruction and training. Of these a fixed proportion are required to be cavalry, and every cavalry soldier is required to furnish his own horse, to whose education and training as much attention is given as to the soldier himself. In the artillery service also many horses are used, and these are furnished on requisition of the military authorities, by the communes or towns. These horses, like those in the cavalry service, are trained and accustomed to every kind of duty likely to be exacted of them in actual campaign. These horses range from six to nine years of age, and, when educated, are registered like soldiers.

Then generally each year, the latter part of summer, a large division of the Swiss army, which is not a standing army, of course, makes a campaign of some ten days, sometimes more, into the mountains and passes of the Oberland, the Alps, and the Jura, for the purpose of familiarizing the cavalry, artillery and infantry to all the ordinary incidents and difficulties of a warlike campaign, without the appendix of "killed, wounded and missing." They occupy, defend, and capture strategic points, passes and strongholds, climb and descend precipices, with their artillery, sometimes drawn by the men, sometimes strapped upon the backs of the horses. They accustom the horses to feel as much at ease when a field-piece is fired at their backs as when a pistol is fired by their rider. These campaigns are always conducted by educated and approved officers who have seen service. It is on these expeditions, also, that the soldiers are instructed in the details of making their own tents, selecting their camping grounds, and cooking the coarse provisions which belong to actual military in a wild or hostile country.

The amount and thoroughness of military instruction in the schools vary somewhat in the different cantons, though in all the cantonal schools military instruction is given. In Berne, for example, the cantonal schools rank somewhat like the Grammar and higher grade public schools in Boston, or the large towns generally in Massachusetts. They are open to all boys, upon examination. All the boys in these schools are organized with military corps, and officered from their own class, but provided by government with special military instructors, and furnished with small muskets, rifles, or carabines, suitable to the strength and age of the boys; or, if organized into artillery corps, they are supplied with small side-arms and field-pieces, which they can wield without difficulty.

For these arms arsenals are provided by the government, and custodians are appointed to keep them safely and in good condition, when not in actual use. The military instructors are officers of the federal military organization; educated men who have seen service, and who are *au fait* in the theory and art of war. The time devoted to military studies and training in the manual exercises varies with the season and in the various cantons. During the summer about three half days a week is the average time. There is also an occasional general muster, when all turn out together and occupy a spacious parade ground. Then the whole population of parents and friends, as well as the cantonal authorities, turn out for a holiday, to witness the nascent valor and heroism of the republic.

It should be added that all these cantonal cadets wear a simple and modest stripe for a uniform, and one or two bright buttons, which cost almost nothing, but give the wearers a soldierly pride and love for this branch of their studies.

There is much in Switzerland to remind an American of New England. The people are similar in many respects,—in their industry, their thrift, and their love of liberty; while the similarity of the farming, of the crops and the climate, is quite striking. The yield of apples in most parts of Switzerland was very great, while the hills of some of the cantons were covered with thriving vineyards. As I arranged to return here and to cross the Alps again, with Mr. Fogg, I shall have occasion to recur to this country again, on a subsequent page.

We left Berne and its bears for Zurich, on the beautiful lake of the same name, passing through an interesting and highly cultivated section. A few hours was all we could devote to Zurich at that time, as we were on our way to Germany and the Rhine.

Crossing Lake Constance, less picturesque and less beautiful than most of the other Swiss lakes, we are in the kingdom of Wurtemburg. There is the royal steamer, not far off, running down the lake. It is a large and beautiful boat, for a lake steamer, and has the royal ensign flying at the mast.

Standing here upon the deck of the little steamer that is setting us across, we can see four kingdoms, all bordering upon the lake. There is Austria at the southern extremity, and the mountains of Tyrol; there is Bavaria where you see that pretty town of Lindau on the eastern shore; there behind us is Switzerland, with its fast receding mountains; at our left, at the northern extremity, where the Rhine pours its swift waters from the lake, and where rises the town of Constance, is the Grand Duchy of Baden. There is where they pronounced the sentence against John Huss, who was burnt alive by that famous council.

And here, where we are fast nearing the shore, is Wurtemburg. There rises the royal pleasure-house of King William, in the pretty town of Friedrichschafen. Without trouble at the custom house, as this is a free port, we are soon seated and off for Ulm.

The most striking agricultural feature of this part of Germany is the abundance and universality of fruits. Apples, pears and plums hang in profusion from every tree. Seldom have larger yields been seen here or anywhere else. Nearly every tree has need of props to support its overburdened limbs. I soon learned that vast quantities of fruit are exported annually, and that it forms a prominent source of income to the growers. From Fredrichschafen, where we landed and took the train, to Ulm, is fifty-eight miles, through a country generally flat and uninteresting. Ulm itself is situated on the left bank of the Danube at its junction with the Iller of the Blau. Its old fashioned houses, and its narrow streets present nothing very attractive. The fortifications are the most remarkable objects in the eyes of a traveller. They are extensive and apparently well planned. Stuttgart is the capital of Wurtemburg, fifty-eight miles from Ulm. It is a fine well built city of forty-thousand inhabitants, situated in the midst of vine-covered mountains which make it very desirable as a summer residence.

Here I determined to make the most of my knowledge of German by calling at various government offices to learn what I could of the agricultural condition of the country, and after blundering into several different departments, a walking illustration of the pursuit of knowledge under difficulties, I found myself where I ought to have gone first, in the department of the Minister of the Interior, and here occupied myself in the operation of pumping various public functionaries, rather more to my own amusement I am afraid than theirs.

The general direction of the agricultural system of the country is under the jurisdiction of the Minister of the Interior. A sum of four or five thousand florins a year is voted for the encouragement of agriculture, in addition to paying the expenses of the agricultural institute at Hohenheim, erecting its buildings, and supporting the royal establishments for horse breeding.

A royal council of agriculture, composed of seven members, is instituted for the purpose of examining and reporting to the government upon such propositions as the Minister of the Interior may submit for its consideration. The duties of the councillors are honorary, the secretary alone receiving a salary. This council is the centre of all the agricultural societies of the country, but its connection with them is strictly administrative or advisory, and consists mainly in keeping the minister informed as to their organization, their proceedings, the laws which it may be desirable to pass to make them more effective, &c.

The agricultural institute at Hohenheim, the most successful in Europe, is placed under its patronage and control. The director of the college, who has absolute authority as to all the internal details of the establishment, has to make his reports to the royal agricultural council.

There are from sixty to seventy agricultural societies organized by counties or departments. These make their reports to the royal council. Some of these societies require no entrance fee, the object being to induce the poorest farmers to become members. They depend, to some extent, upon the aid of the government and more upon that of the department or county, from which they ordinarily receive two or three times as much as from the general government. From both sources they have liberal encouragement. The presidents and secretaries of these associations are chosen by themselves and receive no compensation. Four or five of the societies join each year in a kind of agricultural congress.

Besides these various means of encouragement extended directly and indirectly by the government, honorary distinctions are conferred upon eminent farmers of the country. Among these distinctions are such titles, created and conferred by the government, as Councillor of Agriculture, Councillor of Domains, Privy Councillor, and Privy Councillor of His Majesty; all of which forms a sort of classification of farmers, according to the proofs of qualification which each has given, so that when the government has need of some special services it knows upon whom to call, with a certainty of securing the particular qualifications it may require.

The first title, Councillor of Agriculture, is conferred chiefly upon farmers and professors of agriculture of acknowledged merit. The title of Privy Councillor of His Majesty is the highest in the scale, and is considered one of the first dignities of the country. Several eminent agriculturists of Wurtemberg are honored with this dignity, which they owe to their success in practical agriculture.

From the beginning of the reign of King William, in 1817, many agricultural reforms have been undertaken, and the foundation laid of many rural establishments which have largely contributed to the prosperity of the kingdom. The sovereign in fact became the first farmer in the country. As early as 1810, when heir apparent, he took a lively interest in agriculture, and established a small breeding farm for horses at Scharnhausen, and when he came to the throne he acquired the estates at Weil and Kleinhohenheim, and enlarged that at Scharnhausen. All three estates were devoted to the raising of horses, and still continue to be the most extensive establishments of the kind in the country. But he did not devote himself exclusively to horses, but showed much inclination to foster all branches of agriculture, and these estates contributed not merely to his personal tastes, but to the various projects of agricultural reform which he had conceived. The people of his kingdom were devoted in a great measure to the labors of the field, but opposed from prejudice to the adoption of improvements and new-fangled notions. Even the great land-holders knew little of agricultural science, and did not appreciate the charms of rural life. The country had been much impoverished by long continued wars. Circumstances were not very propitious to the royal projects, but the king was determined to awaken in his subjects a taste for farming. The royal farms therefore soon became model establishments which excited emulation and spread agricultural information.

The country gradually came to look favorably upon these salutary projects of reform. From its geological formation and its situation it offered abundant resources for permanent progress. The vine extends over certain portions, especially in the valley of the Neckar, about Marbach and Stetten. In the valleys of Urach, Mezingen and Leuningen, a wide extent of country is very suitable for fruit trees and pasturage, intersected by beautiful forests. But even the most fertile soil requires to be roused by human activity, and by the example and efforts of the king, the country has taken an honorable position in the agriculture of Europe.

That success has attended the king's undertakings is shown by the fact that in 1816, the year before he came to the throne, there were but 585,000 horned cattle in Wurtemburg, whereas on the first of January, 1859, there were 842,000. The number of sheep was about the same as at present, but their quality was much inferior. The number of sheep in 1859 was 609,000, and the inferior qualities of wool were only thirteen per cent., whereas in 1816 the percentage of the same class was sixty-five. The number of horses over two years old at present is over 81,000, and several hundred a year are sold and exported, while the 73,000 in 1816 scarcely sufficed for the wants of the country.

The council mentioned above examines all questions requiring investigation, with respect to these public agricultural establishments, and submits clear and brief reports upon them for the approbation of the king, and they are carried into effect without delay. The financial part of these establishments is intrusted to the council of domains of the crown. Two functionaries reside at Stuttgart, one charged with the general management of the breeding stables, the other with the agricultural and economical division. A veterinary surgeon is attached to each establishment.

The solicitude of the king extends to the employees of these studs. They are paid regularly, and receive in addition to their wages more or less clothing, and a lot of land to till on their own account. Their widows or orphans are provided for by a sort of mutual life insurance company. Day laborers are often hired.

The arrangement of these breeding establishments is simple and practical. Each is surrounded by an embankment four or five feet high, with a ditch the whole length. Upon this embankment there is a hedge. The fields and pastures are also surrounded by live hedges, and the drive-ways and roads are all bordered with fruit-trees. Some portions of the ancient forests are still left. The pastures are rich; the water abundant. The climate is favorable to fruit trees, while rye, oats, wheat, beans, vetches, beets, clover and lucerne are cultivated successfully. Sorgho is also acclimated there, and gives good crops. The situation of the estates is picturesque and beautiful.

Arab horses are raised for the saddle, and a half-blood for draught. These latter are of two classes: one white, a cross with the English horse; the other black. The king got first a pure Arabian stallion in the East. This was brought home in 1817. He was white, and said to have been of rare beauty. He was kept as a breeder to the age of twenty-four, and died at twenty-six. He is said to have got not a single inferior horse. Subsequent importations have also been made. It is claimed that pure Arabians, which are now quite numerous in those long-continued establishments, are not only not inferior to the pure Arab of the desert, but that their size is increased, and their form more perfect; their beauty in every respect equal. Much of it is due to better feeding, probably.

The white half-bloods have turned out very fine horses. They are got by crosses with vigorous English and Irish mares with an Arab stallion. There are public sales of horses at the royal stables twice a year: one in April, at the time of the horse fair in Stuttgart, and the other on the 30th of September. At Weil and Kleinhohenheim are also large dairies of cows, many of them of a Swiss origin, others probably of Dutch, but there are many different breeds.

The general diffusion of intelligence among the people of this kingdom, is a striking feature as compared with that of France. Probably the system of primary instruction is more complete here than in any other part of Germany. I recollect that in going from Ulm to Stuttgart, we fell in with a common practical farmer and his son, who left the train with us at the latter city, and kindly volunteered to be our guide through some of the principal streets, pointing out as we went along many of the prominent buildings. He had a farm in the neighborhood, and was on his way to it. These, and all in the same class whom we happened to meet, were well informed, and I learned much from them of the condition and character of the country through which we passed, and of the inhabitants. There is not a peasant, however low, who does not know how to read, write, and cipher. Many of the women whom we saw at work in the fields, appeared from their dress to be very poor. All the people have the same means of education, and what is more, they are obliged to avail themselves of the means offered them by the state. There is a kind of affability, openness and simplicity about them, the laboring classes as well as those in higher stations. A stranger has an instinctive confidence and trust in travelling among them, as in Switzerland, which contrasts very strongly with the natural distrust one feels among the people of southern Italy. There are no beggars here ; but honest industry, struggling no doubt often against the frowns of fortune, appears to be the universal characteristic of the poorer classes in Wurtemburg.

Seeing some cows, yoked two abreast, at work in a field, a thing we constantly saw both in Switzerland and Germany, I asked my German farmer if he thought it was good economy. His reply was that they were generally worked but lightly when in milk, and that if pretty well fed, as they generally appeared to be, they would not fall off very much in milk, but still they do not give as much. Women do all kinds of farm-work here. We saw them of all ages, loading hay, raking, pitching on, mowing, digging potatoes, hauling out and spreading manure, engaged in fact in all the hard labors of the farm. We could not help asking ourselves the question, what could be the condition of the houses and the housekeeping among a class of people subjected to such constant drudgery, browned and blackened by exposure in the field? But this is the common lot of the peasantry throughout Europe.

But there is the school-house, the most comfortable and remarkable for its neatness and elegance in the neighborhood, and where this exists the labor cannot be wholly unintelligent, especially where instruction is obligatory up to the age of fourteen years. Each school is strictly watched by a commission of the leading men. The child is responsible to this commission, and at the first and second offence or failure to attend, liable to be punished by the instructor. At the third offence the parents are liable to a fine, and again, after all is over, when drafted for service in the army, if the son cannot write the parents are liable to a fine in the same manner.

The country for miles around Stuttgart is undulating and picturesque, full of magnificent apple and pear orchards, which border all the highways, almost without exception. Their cultivation, with that of vines, roots and grass, interspersed with ponds, rivers, meadows and forests, the neat and pretty houses, and good roads, all give one the impression of prosperity and good government.

We left with regret, and pursued our course down the Neckar to Heidelberg. This old city is in the Grand Duchy of Baden, beautifully situated at the beginning of the valley of the Neckar. The old castle, situated on a high eminence overlooking the city, is an object of interest from its historical associations. The neighborhood shows many evidences of high cultivation and productiveness. The sugar beet, tobacco and Indian corn are conspicuous among the crops raised.

As we descend the river towards Frankfort on the Main, the cultivation of the vine increases. We stopped at Frankfort long enough to visit the house where Goethe was born, and to see his statue, and the other objects of interest in that old free city, and then began the tour of the Rhine.

Here, between Frankfort and Mayence, is the celebrated Hockheim, one of the oldest vineyards in Rhenish Prussia, and which has given the general name of Hock to all the light Rhine wines of this section. The vineyard is on the summit of a hill, and contains not far from eight acres, which are said to be worth a "ducat a foot." The whole has a fine exposure to the sun all day, and is completely protected from the cold winds. A little brook runs along the hill, conveniently for irrigation, if necessary. A sparkling wine has been made at this vineyard for some years past, called Moussirender-Hockheimer, the first quality of which is the well known Nonpareil. Many prefer it to Champagne.

We enter now what has been called the "Paradise of Germany." A thousand associations cluster around its vine-clad hills, and its crumbling, picturesque ruins. Here Cæsar led his armies. Here Charlemagne established the largest empire in Europe. Here the printing press was first set in motion, at Mayence. Here Napoleon won some of his great victories. History, poetry and romance have lavished their charms upon this river, and the country upon its banks.

The vineyards on the Rhine have long been celebrated. It is not easy to see in what their beauty consists, except at the time of the vintage, when I know they are most attractive, so much so as to make it difficult to keep hands off. The vine here is kept low, as described in speaking of Burgundy, and tied to stakes set in rows about three feet apart, each way. Except when loaded with purple clusters, a crop of beans is equally beautiful, and a field of Indian corn a thousand times more beautiful and majestic. The foliage is kept down by carefully trimming off the new shoots, and the vine is not allowed to grow more than about four feet high.

A vineyard requires more care and labor, especially upon the steep slopes of the mountains, or high hill ranges, than we are apt to imagine. I saw many acres, both on the Rhine and the Rhone, so steep and inaccessible that every particle of soil and manure had been carried up in baskets on the heads of women. The plough is not used in the vineyard. The whole cultivation is that of patient hand labor. In cold and exposed situations, each vine has to be bound up in straw late in the fall, and carefully opened in spring.

I often wondered how it was that the vineyards were not fenced and protected, for they are everywhere open here as they were in France and other parts of Europe. Is it possible, thought I, that the grape is not stolen, or the owner molested? Are people more honest here than in other parts of the world? On inquiry, I satisfied myself that boys are boys all the world over, and light-fingered men and women quite as plenty, and in many sections a great deal more so, than in America. When the grape begins to ripen so as to tempt the intruder, a guard is placed over them by the government, and kept night and day, except when workmen are employed in the field. It is even said that during the ripening of the grape, the owner himself is not allowed to enter his vineyard without permission or giving notice, as the guard, who watches several fields, could not distinguish individuals at a distance, and could not be expected to leave his post and run half a mile to see that all was right.

So too the police fix the day when the vintage shall commence, as they do with respect to the harvest of many other crops in Germany, and if the owner does not comply with the laws as to giving notice, &c., he forfeits his right to the protection of his vineyards, at the government expense, and must look out for himself.

It is easy to see, that where land is held in such extremely small lots as it often is in France and the Rhine provinces, and indeed in many other parts of Europe, the expense of fences must be very large, and for many of the poorer farmers quite out of the question. I was often struck with amazement at the perfect security of flowers about railway stations and in the public grounds, about palaces and other buildings, till I learned that molesting even the smallest flower is severely punished by fines. The police are everywhere present, also, and the chance of escape, I apprehend, would be extremely small.

Again, I often asked what varieties of the grape were cultivated? Whether they were known by any general names? The most common variety is called the Riessling. It is a small white grape, rather harsh, but said to make a wine of fine "bouquet," especially in a hot, dry season. Then the Kleinberger is a favorite grape, very productive, ripening early. The small Orleans grape furnishes a strong bodied wine. Most of the Rhine grapes are white, very few red varieties being cultivated here. It appears that at a congress of fruit-growers, held at Mayence, it was ascertained that there are about ninety varieties of grapes bearing different names, in the Rhenish provinces, and from all Germany about fifteen hundred different kinds were represented, many of them having local names, but really the same.

How is it in regard to the profits of vineyards? In a good year they pay well. They create a great demand for labor, and prosperity is the consequence. But there are seasons of failure, bad years, in which the vine-grower has to suffer great loss, and the community is brought to the verge of starvation. A celebrated political economist says the people of wine and silk making districts are the poorest and least intelligent and most miserable of any, owing to the uncertainties of this culture, the result often depending on influences beyond the control of art and industry. For these bad years cannot be foreseen and provided against. Vineyards, therefore, must be owned by large proprietors, who can afford to lose a year or two now and then, while the poor laborers who depend upon their daily wages really have nothing to do in such years, and suffer in consequence.

The vines along the Rhine are planted on the sunny slopes or southern aspects of the hills, where they are sheltered from the cold winds. On the tops of these hills, overlooking the river, are many old ruins of convents, the remains of Roman walls and feudal castles.

We passed by the far famed castle and vineyard of Johannisberg, often called the "Throne of Bacchus." This old castle dates back some eight or ten centuries. In 1816 it was given by the "allies" to Prince Metternich as an acknowledgment of his great services as a statesman and diplomatist during the wars of Napoleon. Just around the castle there are sixty-three acres of vineyards, though only two or three of them, right over the vaults of the castle, produce the very best wine, which often brings two or three dollars a bottle. The Johannisberger takes the lead of the Rhine wines, but the quantity of the superior wine is not large. The whole district along here is one great wine-garden, but the quality of the neighboring vintages is not uniform. Near Johannisberg is the Strahlenberg, and not far off the Steinberg.

Farther down this beautiful and almost classic stream we came to Bacharach, another section noted for its superb wines, and then the Drachenfels, or the Dragon's Rock, that Byron speaks of:—

"The castled crag of Drachenfels
  Frowns o'er the wide and winding Rhine,
Whose breast of waters broadly swells,
  Between the banks which bear the vine,
And hills all rich with blossom'd trees,
  And fields which promise corn and wine,
And scattered cities crowning these,
  Whose far white walls along them shine."

I am obliged to omit very much that I had written upon this section of the Rhine, on account of the already too great length of this imperfect sketch.

And here we are at Bonn, the birthplace of Beethoven. Here too is the University where Niebuhr and Schlegel taught, and the Cathedral founded by the mother of Constantine the Great. Without stopping long at this interesting place, we hastened on to Cologne, where we took time to look over the city, visit the Cathedral, some of the establishments for the preparation of *eau de cologne*, and other objects of interest. But as I visited this place again later in the season, and had still farther time, I shall defer an allusion to it for a subsequent page.

We took the boat for Arnheim in Holland. The land of the Rhine below this point, in fact below Bonn, which is about ten miles above Cologne, is flat, and compared with that above, from Bonn to Mayence, uninteresting, both in a picturesque and in an agricultural point of view. From Arnheim, the chief town of Guelderland, we proceeded by railway to Utrecht, and thence to Amsterdam, Haarlem, the Hague and Rotterdam. Holland, it is well known, is a country mostly reclaimed from the sea by a series of dykes, to keep out the encroachment of the salt water, and wind and steam-mills to pump out the fresh. The country is therefore low and marshy, and the soil rich, deep and easily tilled. Amsterdam might be compared with Venice. It has a series of canals almost as extensive, and much of the transportation is conducted by means of the water communication reaching to nearly all parts of the city. It is entirely built upon piles driven into the soft bog beneath, while its canals are spanned by about three hundred bridges. The great palace of stone stands upon thirteen thousand six hundred and ninety-five piles. The circumference of the walls is about nine miles.

There are here extensive and valuable collections of Dutch paintings, interesting and instructive zoölogical gardens, and many other objects of interest. The stranger is at once struck by the bustle and activity of the quaintly dressed people, the curious old buildings, and the lively market. There is a wonderful old clock by the marble stadt-house that plays on its many bells, the bell song in Mozart's *Zauberflote*.

We passed by the extensive works for draining the Haarlem lake, by which thousands of acres are brought under cultivation. Haarlem is famous for its extensive assortment of hyacinths, tulips, and in fact all other bulbous rooted flowers.

Thousands of black and white cattle, the prevailing color of Dutch stock, are seen grazing upon the fields, more than I ever saw, in any country of equal extent, an indication of the richness of the soil and of its high state of cultivation. As I fell in with practical farmers in various parts of Holland, I took considerable pains to inquire with regard to the character and reputation of the cattle, where the best were procured, and the prices at which they were held. It seems that the cows of North Holland, the Beemster, and those around Haarlem, are considered the best, and are about equally good, and the prices about the same. The cows of these sections are great milkers, and the dairy business is carried to great perfection. As I have given all the details, fully illustrated, in the work on "Milch Cows and Dairy Farming," it is not necessary to dwell upon them here.

The ordinary price of the best cows in Holland, as I was informed by farmers who kept them, is from one hundred and fifty to two hundred and fifty guilders, the guilder being equal to forty-one cents; but the very best in the Beemster and about Haarlem are held at from two hundred to two hundred and fifty guilders; the general average of very good ones being about one hundred and seventy to one hundred and eighty guilders, or from $68 to $72. The very best bulls are not nearly so high, and plenty of good ones can be had for twenty or thirty dollars, though the choicest are often held nearly as high as the best cows. This was the uniform statement of practical men, and quite independent of each other, in different parts of Holland. As to the dairy qualities, no cow could help giving a great quantity of milk on the rich, juicy grasses of the polders; and there is no doubt that the Dutch are fairly entitled to their high reputation in this respect.

The peasantry of North Holland—the females, I mean—still cling to a curious old fashion of wearing skull shields of metal, often of the richest gold, brass or tin, according to their means, under their clean lace caps, projecting out on each side of the face in great square ornaments almost as large as a curtain holder. It struck me at first as the most ludicrous custom I had seen; but I was told by an intelligent lady that the peasantry were generally rich, many of them very rich, and that they put a good deal of their money into these gold ornaments as a safe investment. Wouldn't they get a good premium if they would just now send them over to New York?

Passing Leyden, the seat of the well known university, we soon come to the home of the Dutch aristocracy, the beautiful Hague, and skirt along near the king's park and palace grounds. Then comes Delft, with its quaint old pottery, and Schiedam, with its innumerable wind-mills, built for the distilleries, and we are landed in Rotterdam. The whole extent from Amsterdam to Rotterdam is one vast meadow, with here and there a town on the way, and the people quaint, clean, and not altogether uninteresting.

Rotterdam is also a city of broad canals and innumerable bridges. Every thing about it, except the hotels, is as clean as if it were scrubbed every morning with soap and water. In the market square stands a statue of Erasmus. The house in which he was born is still standing here. This city, the second in the kingdom, is in the province of South Holland, situated very prettily on the river Maas, nearly twenty miles from its mouth. We arrived in this curious old city in the midst of a great fair, and had every opportunity to see the customs and the sports of the Dutch. I am sorry I cannot dwell longer upon them, but we must be off for Belgium.

We had but little time to stop at Antwerp, a fact that I much regretted, as there is scarcely a place in Europe so rich in splendid churches adorned with more wonderful works of art. Here Rubens, and Vandyke, and other great masters of the Dutch school, left some of their best productions to add to the glory and fame of their native city. The winding and crooked streets, the quaint old houses rising up five or six, often seven, stories, with the most remarkable and grotesque combinations of architecture, tapering at the top to a pinnacle, with their fronts ornamented with rich tracery; but above all, the grand works of art, the great original of the *Descent from the Cross*, the grand master-piece of Rubens, are worthy of a careful and minute inspection. The country, for most of the way to Brussels, was carefully cultivated and very productive.

As we approach Brussels, we see near the road the old palace of Lacken, where Napoleon planned the campaign of Russia and signed the declaration of war against the Czar. Here, also, he enjoyed the fascinating society of Maria Louisa, the successor of the amiable and unfortunate Josephine.

Brussels, the city of laces, is partly French and partly Flemish. In the upper parts of the town, with its magnificent squares, palaces and parks, adorned with trees and statues and fountains; with its broad and beautiful promenades, full of a gay and lively crowd of people, we seem to be in Paris. Down the hill, through the street of the Nymphs, we meet only broad-faced women, talking a language we do not understand, in costumes we have never seen before, with old wooden shoes, coming into the market with their fruits and vegetables. The houses are quaint, the carts are quaint, the men move slow; antiquity itself could not offer us a scene more unique.

We stopped in the upper town, in the square near the Hôtel de Ville. Here is where Charles the Fifth of Spain exercised his gigantic power and ruled the destinies of so large a part of Europe. It was afterwards, on the 7th of September, 1556, in this same Hôtel de Ville, that this proud monarch abdicated his throne in favor of his son, Philip Second, voluntarily giving up a power not often held by any man. Here, too, in the centre of the square, now so beautifully shaded, the blood of Count Egmont flowed at the order of the great Duke of Alva, who stood in the window opposite and looked upon the execution of his victims. This square rang with music at the magnificent ball given to the officers of the allied armies, at which the Duke of Wellington first heard that Napoleon had advanced to meet him at Waterloo. Who has not read those soul-stirring lines of Byron, beginning—

> "There was a sound of revelry by night,
> And Belgium's capital had gathered then
> Her beauty and her chivalry."

Who cannot imagine the sudden confusion which this announcement must have made upon the joyous company, so admirably expressed in the same beautiful poem?

> "And there was mounting in hot haste; the steed,
> The mustering squadron and the clattering car,
> Went pouring forward with impetuous speed,
> And swiftly forming in the ranks of war."

There is a fine cathedral in the city, founded in 1010, but it is not equal to many others we have seen, either in the magnificence of its architecture, or its works of art. The palace of the fine arts was commenced in 1346, and finished in 1502. The conservatory of arts and trades is in the palace of industry. There are also cabinets of paintings, natural history, natural philosophy, public libraries, &c., a botanical garden, a royal society of horticulture, and many very interesting private collections of art.

The celebrated field of Waterloo is about twelve miles to the south of this city, on the road to Paris. The great forest of Soignies lies on the way, now intersected with carriage-ways for pleasure-drives. Byron, by a sort of poetic license, calls this the forest of Ardennes, in those oft-repeated lines,—

"And Ardennes waves above them her green leaves,
Dewy with Nature's tear-drops, as they pass,
Grieving, if aught inanimate e'er grieves,
Over the unreturning brave."

We spent much time on this field, so celebrated in the history of modern times, under the guidance of an enthusiastic old sergeant who fought under Wellington on that memorable 18th of June, 1815. In the old shattered chateau of Hougoumont, which suffered severely in the battle, the kind-hearted lady gave us a taste of genuine old Flemish cheese, and bread and milk. This place remains just as it was left after the battle. The rent of the farm is from twelve to fifteen dollars a year per acre. The land is good, but the buildings quite dilapidated, designed no doubt to show the constant concourse of strangers how they were left after the hard struggle. A ploughman was at work with two horses abreast, turning up the rich dark loam on the place of the thickest fight where the French, who advanced to attack the British column, were driven down the hill with tremendous slaughter.

The agriculture of Flanders has long been distinguished for great exactness and care in attention to details. Judging from the crops produced, it is eminently successful. I have not often seen a soil so crowded with luxuriant crops, as that in the neighborhood of Brussels, and on the way to Ghent and Bruges. The culture of hops has a prominent place, and so has that of flax and hemp. The soil, along much of the way, is rather light, inclining to sand, but full of dark vegetable matter, especially from Ghent to Bruges, absorbing water readily, but not holding too much—such as would retain the shape of the hand when pressed. It bears great crops of clover, carrots, turnips, potatoes, rye and buckwheat. These lands generally get repeated dressings of liquid manure. The first, just before sowing for rye or oats, and one or two others during their growth. On these light soils they consider the use of coarse stable manure worse than useless. On grass lands they use ashes pretty freely—twenty or thirty bushels per acre. If they have not manure enough, and want to keep land in grass, they pasture instead of making hay, every third year, and think, though they make less profit, that it is better for the land.

I saw the utmost care taken to collect and preserve manures, though perhaps no greater than in some other countries. Street manure, night soil and liquid manure, lime and mud mixed in a kind of compost, pigeon and hen manure, and all other fertilizing substances appear to be thought as much of as if the farmer's whole fortune depended upon them. They prefer to put horse manure on heavy and wet soils, as it is dry, warm and strong, and loosens up the ground, working soon, but not lasting long. Cow manure they consider richer, but not so warming as that of the horse, and while it will last longer, as it does not ferment so soon, the after crop will get the advantage of it, if the first don't. The Flemish farmers mix their manures a good deal. Their hog manure goes in with that of the horses, and they like such a mixture for flax. They mix one-third hog manure and two-thirds horse, let it stand in heaps, mixing it well, and pouring over the heap liquid manure every time it is thrown over.

They use sheep manure too, and consider it one of the strongest and best, as it ferments more than other kinds of manure. On wet soils they will use six loads where they would use nine of other kinds. It will burn grass, they say, if used too freely, and they do not apply it for flax.

In the vicinity of Ghent, where the soil is very light and poor, they are obliged to use night-soil extensively. It is applied often in a liquid form, a cask being used in which it is diluted with water. The cask is set on wheels, and is drawn by a horse, the workman riding on his back, and pulling the tap out by a rope, when it runs out over a board and is pretty evenly spread. But it is often carried round in boats in a solid form for sale, and carried upon the land in troughs, big enough when filled, for two horses to draw, from which it is spread by a wooden shovel or scoop. The results are said to pay well, though it is rather expensive.

All the liquid of the barnyard is saved with the most scrupulous care, and if these careful farmers cannot get enough, they mix in night-soil, pigeon or sheep dung, and dilute it with water. Ashes are brought extensively from Holland and sold for manure, especially on clover and poor grass lands. Most of the Flemish are coal ashes, but these also are used like others, but not thought so valuable. Wood ashes are considered best, but they are scarce.

It is hardly necessary to say that where manures are so carefully husbanded, the crops are kept perfectly clear of weeds. I saw in no other country such pains taken to keep the land free. Twitch grass is their great pest, as it is with us. They pull it by hand, or try to kill it by ploughing and harrowing, fallowing and cultivating crops that smother it, like buckwheat. Flax is very carefully weeded, like other crops.

Stall feeding, I should say, is very common, not quite universal, but pretty near it, in some parts of Flanders. The number of cattle a farmer keeps well is a pretty good criterion of his prosperity, as by this means alone can he make the largest possible amount of manure. This explains why we see so large a proportion of fodder crops, like carrots, clover, parsnips. Cows are kept almost as much for the manure that can be made by them, as for their milk. It might be said that we have not so great a necessity for this extreme care in regard to manures, that our population is less dense, our land cheaper and our labor more expensive, but have we not yet much to learn from them, or rather much to practice, for few of us practice all that we already know. In all times and all countries manure is and has been the basis of success, and yet few of us manage it as if any thing important depended on it. The liquid manure which many a farmer in Massachusetts wastes every year would, with decent care, more than pay his taxes.

But here we are at Ostend. From there we crossed the channel to Dover, and thence to London and to the north, to Stratford upon Avon, Chatsworth, Edinburgh, the land of

Scott and Burns, and so up to the extreme north, over the lakes, beyond Inverness, down through the Caledonian Canal, among the Highlands, and the Hebrides Islands, and so returning by way of Chester, Shrewsbury and Worcester, to London, and down the Thames, crossing again to Boulogne and Paris. And I now propose, for the sake of greater harmony of arrangement, to ask you to follow me back a little while to Switzerland, till I finish what remains to be said, and to call your attention to England and Scotland on a subsequent page.

It was in September when I left Paris for Switzerland, by way of Strasbourg and Basle, to keep an engagement I had made with that model of a national representative, Mr. Fogg. Strasbourg is a large and flourishing city on the Rhine, the eastern frontier of France. It is particularly noted for its remarkable cathedral, the spire of which is four hundred and seventy-four feet above the pavement, one hundred and twelve feet higher than St. Paul's in London, and twenty-four feet higher than the great Pyramid. It is justly regarded as a master-piece of architecture. The farming in the neighborhood is of the highest order, so far as I could judge from the luxuriance of the crops. Tobacco and root crops covered the ground.

Passing again through Berne and Fribourg, we soon arrived at Vevay, on the eastern shore of the lake of Geneva, on our way to the great Saint Bernard. The vineyards in this part of Switzerland are very extensive, and the grapes hung at this time in great ripe clusters, the most tempting sight I had hitherto seen, for when in Switzerland a month ago, they were still green and comparatively unattractive. It was an agreeable surprise here to meet Mr. Samuel Bowles, of Springfield, and his brother, and to have a ramble of some six miles with them through the vineyards, along the romantic shores of the lake, to the castle of Chillon. There is the dungeon where the patriot Bonnevard was confined, chained six years to a stone pillar, so that he could move but three steps. The path is worn into the solid floor. We saw the torture chamber, the pulleys by which the limbs of the poor victims were broken, the beam on which they burned the feet of prisoners, all scorched with the irons, the oven where the irons were heated, and the stone on which, after torture, they were laid to be strangled, on which it is said more than two thousand Jews, men, women and children, had been put to death. Then there is a short cross-beam, on which criminals were hung, and the marks of a door where they were thrown down into the lake. Climbing up into the oubliette, there is the spot where the victim was made to kneel to the virgin, when a trap-door would open and precipitate him down into a well forty feet deep, where he was left to die of broken limbs or starvation.

Martigny, from which the ascent to the St. Bernard is commenced, is some thirty or forty miles up the valley of the Rhone, from the lake, on the Simplon road, surrounded by lofty and barren mountain peaks. From this point it is about ten hours' walk to the summit, a passable carriage road leading to within two or three miles from the hospice, when the ascent becomes very steep and impassable for carriages. It was one constant rise up the valley of the Drance for over thirty miles, but at last, after clambering up over the broken path, the same that Hannibal trod, no doubt, and after him Charlemagne, and still later the great Napoleon, leading their conquering armies over into the plains of Italy; but at last the dark and gloomy walls of the convent received us, cold and tired, and a hospitable monk immediately had a warm supper provided for us. We did not hesitate to do it ample justice. A blazing fire burned on the hearth, and it was needed here. Though only the middle of September, the atmosphere was that of our November or December, and overcoats and shawls were required to keep comfortable in the morning, as we sauntered out in company with a great tawny yellow, short haired dog, whose benevolent face led me to take to him, and to think how glad I should be to pay his tax and get him registered. We walked out in the cutting, piercing air, to the Morgue, a small stone house open at one side, but barred by an iron grating, where the skeletons and bodies of lost wayfarers are deposited, that they may be seen and identified by their friends. There they were, as large as life, just in the positions in which they had laid when found, the skin dried and blackened, but not decayed. In this high rarified atmosphere no decay takes place. The body is as much mummified as it could be in the hands of an old Egyptian.

It was some gratification to find in the morning that the best room in the establishment had been allotted to us by the kind-hearted monks, out of regard, probably, to the American Minister, whose character they had learned from a young Englishman who had joined us a little before arriving at the top of the pass. There is little vegetation here. A little short, sweet grass, studded with bright spring flowers, yellow and blue, offered a sweet bite for a few cows during a few weeks of summer, kept in the basement in winter. Now and then a little sheltered valley will help eke out the summer season, but most of the food, both of man and beast, has to be carried up on the backs of mules. Just at the end of the little lake which almost touches the end of the hospice, there is a stone pillar which indicates the line of Italy, into which we descended, going down, down, for many hours, with lofty snow-capped peaks on either hand, till we came again to the warm sun and the luscious grapes, now fully ripe here.

It was just in the midst of the vintage as we arrived at Aosta, in one of the loveliest valleys of the Italian Alps, and I shall never forget the loads of grapes, in wagons, baskets, tubs, and every kind of vessel, coming out of the vineyards in all directions, their rich burdens going down into the village to be pressed.

But what specimens of humanity. More than half the men, and three-quarters, probably seven-eighths of the coarse, sunburnt women through these alpine valleys, have their necks enlarged by the goitre, often so enormously as to be perfectly horrible to look upon. Very few men that we saw in the beautiful Val d'Aosta, could by any possibility button a shirt collar round their necks, and as for the women, the appendages to the neck were often larger than the head itself.

And then the villages that we enter and pass, both on the Swiss side, in ascending, and on the Italian, are the most disagreeable imaginable, thickly crowded with old "rattle-down" houses, the narrow streets paved with stones, the side alleys all muddy, swarming with dirty, unwashed, tangled-haired children, many of them cretins or idiots, a result of the prevailing goitre, shut out almost from the pure air and the sunlight of heaven, by over-crowding. Truly they don't know how to live.

The most splendid crops of Indian corn grow along these Italian alpine valleys, and the smaller grains are cultivated to some extent. Walnuts, such as we improperly call English walnuts, grow in endless profusion, and so do chestnuts. The wild blackberries also were very abundant. At Ivrea we saw the beginning of the canals which take out the water for irrigation far down on the plains around Novara. Here we are again in the midst of Piedmont, under the jurisdiction of Victor Emanuel. What a funny mistake we made at the little old town of Chivasso, where we had been advised to stop at the *Hotel della Moro*, which we misunderstood, and went inquiring about, after dark, and on foot, for the *Hotel de l'Amore*.

The next morning we were off for Lago Maggiore, one of the loveliest lakes in the world. I wish I had space to describe the little paradise on the Boromean islands. It seemed, as we approached it, almost like an enchanted palace. We are now turned again towards the Alps, and fast approaching the valley of the Ticino, or the Tessin, as it is often called, which leads up to the pass of the St. Gothard, one of the grandest and loftiest mountain passes in Switzerland. Stopping the night at the genuine old feudal town of Bellinzona, we journeyed the whole day after with an open carriage to ourselves up through this enchanting pass, as far as the foot of the mountain. It baffles description. With lofty peaks, on either side piercing the clouds, myriads of dashing torrents falling from untold heights, in snowy whiteness at our feet, and a foaming rushing river on the side of the road, the journey was ever varied, and full of new and constant charms.

In travelling through the valleys of Switzerland, a large number of goats are seen grazing on the sides of the mountains or coming into the villages at night and leaving them in the morning. Many of these animals are stall fed, or kept in the valleys all the year round. Many others are driven in large flocks to the sterile mountain pastures every morning, while a third class are kept on the mountains through the summer. Those that are stall fed give large quantities of milk. We stopped for the night at a little village called Faido, at the foot of the St. Gothard. Soon a flock of about four hundred of these animals, most, if not all, of them having bells, entered the village in charge of a goatherd and his dogs. Their udders were very largely distended with milk, and they would probably give from one to two quarts apiece, a good yield for so small an animal. Each knew where to go for its night's lodging. In the morning they were again collected, the bells tinkling in infinite variety of tones, and started for their mountain ramble.

These mountain goats somewhat resemble the chamois. Their eye is bright and full of expression, their heads fine and delicate. Their color is a kind of brownish yellow, some of them spotted, others dark brown all over. They are almost as nimble as a fox, and always full of life and activity. The males are bold, capricious and always ready for a joke. It is said that an Englishman was one day sitting on a log, near the inn on the Grimsel, engaged in reading a book. As he got sleepy and began to nod, a he-goat passing by, mistook his sudden and jerking bows for a challenge, and drawing back, sent his antagonist sprawling over behind the log "as quick as lightning," with his feet vibrating in the air. Perfectly astonished with the ease of this victory, the goat put his feet upon the log to look over, as if to inquire whether his victim had got hurt, and running his tongue out as if overcome with laughter at having done something funny.

The flocks of young goats are sent up to the higher mountain pastures in spring and summer, to be pastured at the least possible expense, under the charge of boys, but they seldom mount over seven thousand feet above the level of the sea. They browse at liberty, and are not so easily kept together as the sheep. The pastures which they frequent are too steep and inaccessible for cows. Thousands of these creatures are to be seen in the Bernese Alps, in the Vallais, and in the Tessin or mountains forming the valley of the Ticino. These flocks do not yield milk. They stay on the mountains from three to five months, according to the season, and are kept together chiefly by means of salt, which the boy in charge has at hand to sprinkle upon the rocks around his hut.

These boys, often not more than from seven to ten years old, lead a pretty lonely and miserable life up in the mountains, often obliged to go without shoes and stockings, and with very little clothing, except a few rags, living on old, mouldy bread and poor cheese. A fresh supply of stale bread is commonly carried up to them once a fortnight. They can have no warm and wholesome food, and seldom can resort to any useful employment or even amusement to while away the tedious days. Shivering, cold and hungry, in bad and wet weather, they can do nothing but cuddle down in their miserable log-hut, peeping out now and then to see that the flock, often better off than they, are not straying beyond the bounds.

As the autumn approaches they move down to the cow pastures, and finally, when these become uninhabitable, to the valleys, where they spend the winter. The Alpine goat sometimes gets in among the wild chamois and remains with them for months together, but will generally come down to its winter shed in the fall.

Occasionally a herd of goats in milk is to be met with in the wild tracts of the mountains. The goatherds milk them, and make the milk into cheese, using the whey as their own food. In leisure hours the attendant occupies himself in cutting the little patches of grass often growing on the steepest precipices, and which the goats cannot get at to eat. This he makes into hay in August and September, and carries it down on his back to some accessible store-house or barn lower down the mountain, and when the snow comes, sleds it down into the valleys. Haying in this way is often dangerous, as the goats and chamois, on precipices higher up, often loosen the rocks which come rolling and bounding down, leaving no time to escape.

Butter is sometimes made of goat's milk, but is is quite white and very soon turns bitter; but as it grows old, the older the better, it is used as an effectual remedy for wounds and bruises.

The goat is sold to be eaten by English travellers, under the name of chamois venison, and on one or two occasions I had a strong suspicion that what was set before me for chamois was goat's meat, but I persuaded myself that I had the genuine article on Mont Cenis and on the Great St. Bernard.

Thousands of sheep are also summered on the higher ranges of the Alps which are inaccessible to cows, often rising to over 9,000 feet, where scarcely more than little oases are to be found surrounded by miles of glaciers and snow and rocks, and to which the sheep have to be drawn up by ropes over the edges of precipices, or carried up on the back of the shepherd. I saw many such little islands to which the approach was next to impossible. These flocks are often tended by boys, who are obliged to be on the watch against accidents to which their sheep are liable.

There are several varieties of sheep in the Alps. The Merino endures the climate well, and is sometimes found, but those most commonly seen are larger and coarser, generally white, with very little wool, and that of no great value. From Lombardy, the neighborhood of Brescia, and the southern parts of the valleys of the Ticino, a large, high-legged animal, is driven to be summered in the Alps, called the Bergamesque breed. They have a large dewlap hanging from the throat often to the chest, and long hanging ears. They go to the mountains in great flocks as soon as the snow is melted, browsing by the way as they move along. A shepherd usually goes on ahead to make arrangements to pasture the flocks for the summer.

The flock-masters that come up from the Milanese and the lower Tessin have to pay a toll at the several communes as they pass, as a sort of offset for what the sheep eat on the way. This has got to be, in some sections, a rather heavy tax upon them. The right of pasturage, they pay for to the canton or commune in which their sheep-walks lie, usually to the Grisons. The dogs that accompany these flocks are faithful and exceedingly well trained, so much so that they can be trusted very largely with the care of the flock. Their fare is so limited, consisting mainly of bran and whey, and their life is one of such activity, that they are thin and lank enough. They look as if their life was one of all work and no play. Like that of the sheep they tend and the shepherd they work for, it is one of hardship and deprivation. If the weather is warm when these migrations take place, they travel only by night, but in the autumn, in returning from the mountains, it is generally cold, and then they travel only by day. In this way between thirty and forty thousand Bergamesque sheep migrate each year.

When they get to the pastures the flock is divided, and a part is taken to its own district to graze, another to another district, and so on; dividing usually into four flocks, each having its own shepherd with his dogs. Sometimes they occupy the same hut, if not too far off, but usually each has his separate hut or châlet. Many thousands of these châlets are seen on the high mountain ranges, which are used only in summer. Many of them are no more than sheds or barns where they store the hay that is made, but those on the highest ranges are used for the shepherds and goatherds, and have a kitchen, a sleeping-room, and a room for the dairy utensils and the products of the dairy. Morning and evening the food of these frugal shepherds is hasty pudding, or polenta made of Indian corn or millet, with the addition of whey and cheese. A little hay spread on a board is their only bed. They are temperate and hard working.

In moving the flock from one patch or district to another, the shepherd usually goes ahead, and the sheep follow him over crags and peaks, and when arrived at a halting place wait for his signal, a sharp whistle on his pipe. Another lower drawn note is the signal to march. They are under such discipline that the labor of conducting and tending is far less than it otherwise would be. The coarse wool of these sheep is used for making uniforms for soldiers in the Austrian army and for blankets. They are sheared twice a year. When a sheep dies a natural death they take out the bones and salt the flesh and then hang it on stakes or on the walls of the hut, to dry in the open air. It will not putrefy in the air on the high mountains, and is not offensive to the smell. This dried meat brings a very high price among the Italians. They make also a small cheese of the milk of these sheep, which are driven into a pen, and when going out are caught and stripped by two shepherds sitting at the gate, getting but a very small quantity from each, not more than ten or twelve ounces a day. A little goat's milk or cow's milk is added to make up the quantity requisite for a two-pound cheese, then a sweet whey cheese is made of the whey which is left.

We are now again on this great back-bone of Europe, on the top of the St. Gothard. Most of the scenery on the way up has been of unspeakable grandeur, with now and then a passing cloud, gliding along sometimes above and sometimes below us. We walked a part of the way up through the mountain pastures, while our cicerone and his two-horse carriage wound around the serpentine road. It is a bleak region, just below the verge of perpetual snow and ice. At our feet lies the source of the Rhine, a little rippling jet that we can almost catch in the palm of the hand. We see just at the other end of the little pond the source of the Ticino, that we had followed up from the Lago Maggiore, and not far off again the Rhone begins its wild and devious march to the far off warm waters of the Mediterranean. Winter and spring are in constant struggle on these high Alps. This pass has been stoutly contested in many a bloody battle, which I have no time to allude to here.

We descended much faster into the canton of Uri than we came up from the Tessin, and we are soon down the steepest part of the mountains, and again shut in, as all the day before, by lofty ranges on either side, with the ever swelling, foaming torrent of the Reuss as our companion. An hour before sunset brought us to Altdorf, and the birthplace of Tell, and of Swiss liberty. Here we stopped for the night to visit the spot where the hero lived, which is marked by a little chapel. The spot where tradition says he shot the apple from his son's head is just before our window, marked by an ancient fountain. Innumerable spots are consecrated to the memory of this dauntless man. As we cross the lake of the four cantons the next day, starting from Fluellen, we pass the rock on which Tell escaped the tyrant Gessler, in a storm; the field of Grütli, on the other side of the lake, and many other interesting localities.

This lake of Lucerne is perhaps the most remarkable and pleasing of all the Swiss lakes. The scenery on its borders is surpassingly grand and beautiful, and the pretty town of Lucerne at its end is worthy of a long visit.

But I was bound for St. Gallen, and Mr. Fogg was to return from here to Berne; and so, parting with regret, after a week's excursion among the dear Alps and their lovely valleys, I now take leave of Switzerland, where I enjoyed so many hours; I am only sorry that my limits do not allow me to dwell longer upon it.

After leaving Switzerland, for the second time my course was across the southern end of Lake Constance for Lindau, on my way to Augsburg. At Lindau the traveller is in Bavaria. The mountains of the Tyrol are in sight at the south. The town is small, but very prettily situated on the lake. The country on the way to Augsburg is not particularly interesting, either in an agricultural or a picturesque point of view, being rather flat, and much of it not remarkable for its cultivation.

The taste in the cultivation of flowers about the railway stations is worthy of remark here, as it is in other parts of Germany and France. The greatest luxuriance of dahlias, German astors, and other autumn flowers, greets the eye at every stopping place. This of course adds a charm to the landscape for the passing traveller, and I do not see why it could not be adopted to a far greater extent than it is with us.

Augsburg possesses some objects of interest to a person who has time to spend, but there were so many more desirable places and objects in prospect that I did not intend to remain there any longer than was necessary. I arrived there a little after dark, and as I made it a point not to travel by night, I stopped over for the sake of seeing the country between there and Munich. Its old cathedral is built in the Byzantine style, curious enough. I visited that, as well as the old palace in which the Emperor Charles the Fifth resided when the Augsburg Confession was presented to him in 1635, and the golden chamber and confession hall, interesting for their connection with the history of the Reformation. The hotel I stopped at, called the Three Moors, is mentioned as early as 1364, and is said to be the oldest in the world.

The country between Augsburg and Munich is also level and uninteresting, so far as its scenery is concerned, much of it being nothing more than immense tracts of peat swamp. But here I saw engines run by compressed peat, and had an opportunity to see the whole process of preparation at a large establishment near the railway, while the train was detained. Immense quantities are got out in a fine, loose state, but after being put through the machine, it comes out quite solid, and burns well. There was no inconvenience from the smoke or smell, as one would naturally expect.

Immense herds of cattle are grazed on the plains, each herd under the charge of a herdsman. The color was mostly brown, inclining to black.

The Board of Agriculture has had an exchange of documents with the Bavarian government for some ten years past. I anticipated much pleasure, therefore, in mee ting those with whom I had so long been in communication, and who were in a position to give me all the information I could desire with regard to the agricultural system of the country and the condition of its schools and its societies. As for the rest, having little difficulty with the language, which is here German, universally, I felt confident I could find my own way to the objects of general interest in the beautiful city of Munich, its celebrated collections of art, containing so many of the works of the grand old masters, and its unrivalled cabinets of science and natural history. Who does not know that it was here that Count

Rumford, a native of Woburn, Massachusetts, gained his European fame? Many of the great attractions of the city, indeed, are due to his genius and influence. Through him the city obtained and laid out the beautiful "English Garden," now the finest public park of the country.

But to save the loss of time, I reported myself at once to the American Consul, Mr. Webster, through whose cordial politeness I was enabled to see the city much more thoroughly and speedily than I otherwise could have done; and to the traveller time is not only money, but represents, if properly spent, a vast amount of useful information, always floating about in a strange city, but not always collected and stored away in a foreigner's brain.

After taking a general look of the city, so as to get "the points of compass," I called to see the Baron von Liebig and his celebrated laboratory. Isn't he the embodiment of agricultural science? Hasn't he given a stronger impetus to the farmer's thoughts, investigations and progress, for the last twenty years, than any other man? He is one of the "sights," of course, as much as the far-famed Pinacotok, the paintings of Kaulbach, or the sculptures of Schwanthaler.

Unfortunately it was vacation. His students were away, and what was worse, he was out of town himself. Then we must hunt up Dr. Fraas, the director of the Royal Agricultural Society, the Agricultural College, the Veterinary Institute, lecturer at the University, &c. He holds so many public positions that I cannot remember them all. Here is the Veterinary School and Infirmary; here sick horses, sick dogs, anatomical collections, and all the other paraphernalia of a veterinary establishment, just at the entrance of the English Garden. One room is devoted to the study and preparation of medicines, specimens, &c. Here the students are actively at work, some on one thing, some on another, but all earnestly pursuing their favorite studies. The stalls where the horses are kept are large and roomy, but I was astonished to find the air so impregnated with ammonia, for want of proper ventilation, as to be in danger of putting a horse's eyes out. I think it would have made a well horse sick in less than twenty-four hours. My friend the Consul could not stand it five minutes, and was obliged to rush out into the air to avoid a sudden "fit of sickness." When asked why they did not allow more air, the student who accompanied us replied that they could not bear the air, as they were undergoing a course of treatment.

In the garden connected with the lecture-room and laboratory the various plants used in the preparation of veterinary medicines, and many of the plants, useful only as food for horses, were cultivated. The botanical names were, or had been, apparently, attached to each, but the garden was sadly in want of a gardener to keep the weeds out. Such a collection of plants, if complete and well arranged, must be extremely useful to every student.

In the Botanical Garden, at the other side of the city, where I spent considerable time, there is an extensive collection of the natural grasses, each species growing in a clump by itself, and labelled with its systematic, and, I believe, its common name. This was to me exceedingly useful, and I wish some one would undertake such a grass garden in this country. It would be a powerful aid to the study of this difficult branch of botany, and might lead to valuable practical results.

The offices and rooms of the agricultural society are nearly opposite the old king's palace. The society was busily engaged in preparing for a grand exhibition which was to take place in two or three weeks. The offices of the director, library, &c., were on the second floor, the lower part of the building being occupied mostly with a large collection of old and new agricultural implements. Here I found some very useful machines, "good ideas," credited to England and English invention which were really American, having been, probably, copied by the English from ours, to a great extent, and sent to the continent as English. This is quite provoking. It is hard that we cannot have the credit that properly and fairly belongs to us. But it arises, no doubt, in part from our use of the English language on our implements. They naturally ascribe every thing in English to England. I like the conclusion of the Emperor of Russia, who declares that he will have the *American* language taught in his schools but will have nothing to do with the English. It's a "good idea."

In walking through the agricultural library which is pretty extensive, I quite astonished them by taking down first one, then another and another of our Massachusetts Reports, as they met my eye in various parts of the shelves, not being arranged together. It was pleasant to look upon their familiar pages at that distance from home.

The general agricultural system of the country, that is, the means and machinery employed by the government to encourage the development of agriculture, do not differ very materially from those I have already indicated in speaking of the agri culture of Wurtemburg. There is, as already indicated, a royal agricultural school, modeled chiefly, I should think, after that at Hohenheim, a veterinary school, professorships of agriculture in the universities, very much the same as at Tubingen and, I think, something like twenty teachers of agriculture in the higher schools and institutes of Technology in various parts of the kingdom, and in addition, a general society of agriculture of several thousand members. The whole system is under the general control of the Minister of the Interior, I believe. How far these various instrumentalities have succeeded, how large a proportion of the improvement and progress actually made is due to them, I cannot say, but they are doubtless doing a good work or the government would not continue its liberal bounties.

Bavaria is not so favorably located, nor is the soil so favorable for the production of large crops, as many other countries of Germany. An immense and elevated table land stretches off from the Alps. A large part of the country, in fact, consists of a vast plain lying so high as not to be favorable for fruits, with a soil by no means rich and a climate by no means propitious. We see here none of the vast and luxuriant orchards of pears and apples and plums of Wurtemburg scattered generally over the country. So far as I could judge, the operations of practical agriculture, such as ploughing, harrowing, rolling, the care of cattle and a thousand other things, were less perfectly performed than in Wurtemburg.

Munich is a city of about one hundred and twenty thousand inhabitants, situated on the Iser. It is full of interest, its variety of attractions being sufficient to gratify every taste. In architecture it is rather plain, many of the buildings are in the Bysantine style, but very neat. Every thing is peculiarly German. In passing through the streets, such signs as "Coffee and Wine House of the Kingdom of Heaven," "Tavern of the

Holy Ghost," "Wine Shop of the Virgin Mary," strike the eye.

Just out of the city, on a beautiful green meadow in full view of the Alps, stands the collossal bronze statue of Bavaria, one of the largest and grandest triumphs of bronze casting in existence. It is in the form of a virgin of the old German world, with a magnificent lion by her side. The statue is fifty-four feet high, and stands on a pedestal thirty feet in height, looking towards the city. The figure is designed to typify the kindly recognition and reward of excellence and noble achievement in any of the walks of life. The gigantic and beautifully rounded arm is gracefully raised and holds a garland of oak leaves, as if ready to crown any Bavarian who may show himself worthy to enter the temple of fame. It is the Genius of Reward, and its position is on that broad and beautiful spot devoted to the annual meetings of the people, called the Theresa Meadow, where the great agricultural festival is held in October, and where the king distributes the prizes to the successful competitors. Just behind it, but dwarfed by the size and height of the great central figure, is the Hall of Renown, a beautiful Doric building, of white marble, decorated with many emblematical friezes by Schwanthaler. The busts of the great men of Bavaria, irrespective of origin or religious belief, are arranged along its walls in full view from the meadow below. Count Rumford is among them.

It is difficult to form an adequate idea of the grandeur of this figure, the Bavaria, or of the genius required to produce it. The proportions are so admirable that, in looking upon it, one does not notice its size. It is natural and life-like. And yet there is a winding staircase leading up into the head, and this chamber in the head will hold eight persons! It was cast from Turkish cannon sunk in the battle of Navarino, and brought up by Greek divers. The casting occupied ten years, at five different times. The head came first in 1844. No less than twenty tons of bronze had to be melted for the bust, five tons more than had ever before been melted in the furnace.

The Triumphal Arch is another of the great works that adorn this city. It is erected over one of the gates, made in imitation of the Arch of Constantine at Rome, and dedicated to the Bavarian army. On the top is another figure of Bavaria, in bronze, seated in a triumphal car, drawn by four lions. The beautiful embellishments in the form of medallions and basso-relievos, represent the various provinces, with the pursuits of each, as *Upper and Lower Bavaria*,—agriculture, cattle and Alpine scenery. The *Palatinate*,—culture of the vine and fishing, &c.

Munich is quite celebrated for its beer, and the consumption of *lager* is enormous. From six o'clock in the evening till ten or eleven, the whole male population of the city is to be found in the beer saloons of the most noted brewers, where all classes sit, drink and smoke till it is difficult to see across the room. This is a general characteristic of German towns, but I am inclined to think it is carried farther at Munich than in most others.

The dogs of Munich have a closer examination than any dog is subjected to with us. Twice a year, on a certain day, each quarter of the town is required to send all its dogs to the police. If a dog is in perfect health he receives a little ticket, which he wears round his neck. If old or unsound, he is condemned to death. Any dog which has n't a ticket is liable to suffer death, and all dead dogs and dead horses are buried in a certain place near the city.

The "Iser rolling rapidly" did not make much of a show when I was there, but its banks were lined with busy washerwomen, leaning over from low plank platforms, engaged in the energetic application of strength to linen. Their bright colored boddices and gay petticoats are decidedly more attractive than the river itself, except where it winds through the beautiful English garden.

Of the celebrated galleries of paintings and statuary contained in the old and the new Pinakothek, of the statuary of the splendid collection in the Glyptothek, of the superb collections of anatomy and natural history which I saw in this beautiful city, it would be impossible to convey any adequate idea without passing beyond the limits of this report. They would require volumes of description. But the most interesting feature, and that which characterizes most German, and in fact most European cities, is that the people are allowed free access to them on certain days, and can study the works of the most renowned masters without let or hindrance.

But still the idea is forced upon us that it is the people, after all, who support these great establishments, and that it is only a comparatively few of those who have to pay for these magnificent collections who can derive any benefit from them. The poor peasant who tills the soil on the continent of Europe has little time to spend in looking at fine pictures. Of the whole population of a great kingdom how many can go up to the capital even, to say nothing of the time required to derive any benefit from a cabinet of fine arts when there. The Germans often wonder at the fact that we have not with us splendid art collections like theirs, and infer that our people are far behind them in the love of the beautiful. But so far is this from being true that it is not too much to say that in those things that indicate refinement, taste and cultivation, in our houses, both in the cities and in the country, we are more than a century ahead of them. Most of our common class. of houses, in large towns especially, are furnished or arranged so as to promote the utmost comfort and luxury, and those who live in them are in a position to derive a far more refining influence than they could from gazing at fine pictures once or twice in their lives, or even every week in the year.

The evidences of a perception of the beautiful in art in our American houses are infinitely greater, and in all that promotes the daily comfort, cleanliness, intelligence, refinement of manners and ease, the houses of the same class of people, or people in the same circumstances, of the two countries, are not, in any respect, to be compared. How any people, pretending to refinement and cultivation, can be resigned to the nuisances constantly under the eyes and nose, in the houses of most German families, and the want of many of the most common comforts and luxuries of life in them, it is difficult to imagine. Let them have their galleries of fine art, established and supported by their governments who must do most of the thinking and planning for the masses. We have a thousand offsets to them in the houses of our people, in our kitchens, our sleeping rooms and our household libraries.

I have said, on a previous page, that among the peasantry, a large part of the work on the farm is performed by the women. This is true in Bavaria as it is elsewhere, and it is not necessary to describe the condition of the houses where the women are kept at work in the fields.

Bavaria is pretty largely engaged in grape culture, and the manufacture of wine. Of the thirty millions of acres which comprise her territory, more than one hundred and twenty thousand are covered with vineyards, but still she imports large quantities of wine from France.

Leaving Munich for Vienna, early in the morning, the road continues on a high level plateau with the Tyrolese mountains still in sight, as we skirt along almost at their foot. There is nothing very striking in the agriculture of this section. For many miles it is monotonous and uninteresting.

The races of cattle which attract the eye in passing through the various parts of Austria are quite numerous. In entering the empire from the direction of Munich, the first considerable town, lying directly upon the borders, is Salzburg, with ten or twelve thousand inhabitants, beautifully situated on the river Salza. Here we pass through a section where the stock is mostly of the Pinzgau breed, dark red in color, with a white line on the back, and generally white on the under part of the body. The head is short, the eye surrounded by a circle; the muzzle is white, the horns about a foot long, and usually inclined back; the hind quarters rather large, and the tail set high. The yield of milk is not very large, but its quality is said to be excellent. The animals appear to fatten easily.

When entering the Austrian dominions from Lombardy, we had formed an opinion of the nuisance of custom houses and rigid rule in Austria, which corresponded very well with our preconceived notions of this country. In entering Austria from any other part, however, one's experience is quite different, and the traveller is subjected to less annoyance than in entering the ports of our own country even, and I very soon learned that there were local and temporary reasons for what appeared to be unnecessary strictness. It was at a time when commotions were anticipated in Italy, from the partisans of Garibaldi, and every officer was on the lookout for suspicious persons, among whom most strangers were, no doubt, included. In other parts of Austria I found the public officers civil and gentlemanly, and after passing the boundaries of the empire no passport was called for, no surveillance was perceptible, but on the other hand, personal liberty appeared to be as fully respected, and everywhere as secure as I have ever known it at home.

Vienna is a city of some four hundred and fifty thousand inhabitants, beautifully situated on the Danube, and showing every evidence of prosperity and splendor. The most extensive and magnificent buildings rise as if by magic. It is estimated that the building in progress at the present time is sufficient to accommodate a hundred thousand additional population. It seemed as if in the midst of a new American city, with buildings on the most gigantic scale rising new and fresh on every hand, warehouses and residences, a new opera-house, to be one of the largest and finest in Europe, while the new public garden, or Prater, gave evidence of the expenditure of immense sums, in filling, grading, landscape gardening, flower culture, &c. We have nothing that can compare with the noble public grounds in and around Vienna, either in the extent and magnificence, or in the taste and elegance with which they are laid out.

The first step on arriving was, of course, to report myself at the office of the American minister, Mr. Motley. Having the good fortune to find there an old university friend from whom I obtained all necessary information as to what to do first, little was needed but to improve the time in studying the most beautiful or the most interesting objects. Vienna is full of such.

There is the grand Royal Zoölogical Museum, connected with the old palace. I spent a day there with much pleasure and profit, filled with astonishment at the extent and completeness of the collection. Room after room, story above story, crowded with well preserved specimens, to illustrate the natural history of the world. The director very kindly took me over the whole establishment, pointing out the objects of most striking interest, and expatiating in German, the common language of Austria, upon various parts of the collection, as we went along. This grand, scientific museum is open to the public free on certain days of the week, and is accessible to students at all times. Many hundreds of people, men, women and children, and teachers with their classes, were visiting the collection like myself, and I could not help observing the earnestness with which all appeared to study the specimens, not as objects of curiosity, but as things of real interest. What an influence the free access to such vast collections must exert upon the character and education of the population.

At the Polytechnic Institute, one of the largest in Europe, it happened to be vacation, a circumstance which I particularly regretted, as I was desirous to see and study, so far as I could, the practical working of so grand an establishment. I was bound not to be wholly baffled, however, and after asking first one and then another, I stumbled, at last, upon the very intelligent custodian of the establishment—told him I was an American, and interested in a similar institution, the Institute of Technology in Boston, and requested to be shown over the rooms under his charge. Without hesitation he accompanied me through all the rooms of the cabinet, and gave me much useful information with regard to the whole. The collections which form the cabinet of the practical arts and trades were magnificent in extent and completeness. There were the most extensive collections of specimens in all the departments, showing the whole process which the raw materials pass through in the various arts; wools, of various kinds and degrees of fineness; the models of machinery for carding; specimens of carded wools; then woollen cloths, woollen garments, and an infinite variety of goods and fabrics made from wool. Then cotton, the plant, the raw cotton, ginned cotton, cotton fabrics of every description. Leather, wood, horn; the numberless ores from which metals are extracted; the cocoons of the silk worm, and illustrations of all the transformations of the insect itself; the processes through which silk passes; silk fabrics; glass and its manufacture; agricultural implements, and every conceivable article used in the mechanic arts.

"These are all used by the professors," said he, "in their lectures before the students."

"How many students have you ordinarily?"

"From fifteen hundred to two thousand."

"And how many professors?"

"Seventeen."

And then there are many working rooms where the specimens are prepared, and where the students are taught the practical manipulations in the arts to which they may be devoting their attention. Who can estimate the advantages which such an institution offers to the young artisans of the country, under the direction of men so situated as to be informed of the latest improvements in all the arts? What a stimulus it must afford to the development of the material resources of a great country!

Then there is the cathedral of St. Stephen, built in 1144, with its magnificent steeple, four hundred and twenty-eight feet high. The great musical bell was cast from one hundred and eighty Turkish cannon. The interior of this grand old cathedral is unique and interesting. It contains the tomb of the celebrated Prince Eugene, whose body lies buried there.

Vienna is very rich, both in collections of art and natural history. Besides the imperial zoölogical cabinets already mentioned, there are imperial cabinets of antiquities, minerals, and plastic arts; the geographical institution; the mineralogical institution, one of the finest and most extensive in Europe, and many others.

Schönbrunn Palace, the residence of the Emperor in summer, is just out of the city, but omnibuses constantly run there, and the people visit it in hundreds daily, in summer, for the walks in the gardens, and delightful drives in the neighborhood. This palace was finished by Maria Theresa. Napoleon's son lived and died there in 1832. The garden is very extensive, laid out in the French style, quite artificial, with straight, broad avenues, lined with trees, trimmed in the most formal manner by rule and square. It gives the appearance of exceeding primness, but it seems to be an unpardonable interference with the ever varying and beautiful forms of nature. On the top of a rising ground, overlooking a vast extent of country, Maria Theresa built what is called a Gloriette, from the top of which the visitor has a most perfect view of the city.

Connected with the garden of the palace there is an extensive botanical garden, containing many flower gardens, palm houses, &c., and a menagerie of living animals, lions, tigers, bears, in great numbers, goats, various kinds of horned cattle, and one of the most interesting and extensive collections of living birds, especially water fowls, that I saw in Europe. The people have free and constant access to all these grand collections, and they avail themselves very freely of the privilege, judging from the crowds of happy faces one always meets there.

I cannot give an adequate idea of this fine city. Its beauty, its wealth, the exquisite taste displayed in its public grounds, the boundless luxuriance of flowers, so skilfully arranged and tended, the apparent happiness of the people, and the patronage of art and science, struck me with astonishment, because they were all on so much larger a scale than I had expected to find them.

I attended the markets, of course. I always made it a point to go into the markets of every considerable town for the sake of seeing the people, their customs and habits, and the products of the country. The market brings together about as fair a representation of the masses as one could find. I regard it as a better stand-point from which to judge of the real practical condition of the people than the exchange. And what better place is there to study both the products of the soil and the mode of life of a community?

So far as the interests of agriculture are concerned, the markets, in most of the large towns on the continent, are far better conducted than our own. There the system is almost wholly that of open markets and complete freedom for the producer, who pays a small duty at the gate of the city. There are no forestallers, no enormous rents to pay, no large bonuses for the right to hire a stall, which must come out of either the producer or the consumer; part of it, perhaps, out of both.

The market women came into Vienna, as they do into most of the cities, bringing whatever they have to sell, and had a particular location assigned them in a street or public square. Each had a basket, or a small hand or donkey-cart, or wagon, and sold her wares just as they were brought in fresh from the country. The fruit and vegetable sellers had a location by themselves; others, with something else,—eggs, poultry, butter, cheese, &c.,—had other locations. The consumers always know where to find them. Thus the consumer and the producer are brought face to face. There are fewer middle men. If the producer does have to pay tribute at the gate of the city, it is small, infinitely small, compared with the splendid establishments which many of our market men have to keep up. I do not know how the price of produce, as a general rule, compares with the prices of the same here. My purchases were chiefly confined to fruits, and in these they were both frequent and—for a single consumer—extensive. These were cheap enough. The most delicious grapes, for instance, could be had for little more than the asking. What is the effect of this system upon the development of agriculture? No rod of ground is left untilled. A poor woman, who cannot own or carry on a farm, can cultivate a little patch, or vacant lot near the city, and be sure of getting for it as much, in proportion, as the large farmer with his hundreds of acres. Hence, around all the cities, there is scarcely such a thing as a vacant lot which is uncultivated, however small it may be. Suppose this were the case around Boston. Every-body knows there are hundreds of acres lying in wait for the purchasers of building lots. They yield no income as they stand. They are too small for the farmer to undertake, perhaps. They would not be injured by proper cultivation, and the aggregate production would amount to a large sum. If they are filled with roots, vegetables of any description, on lease, the receipts, under our present system, would not amount to much to the cultivator, because he must sell them to the market man or the city dealer, to be sold and resold, perhaps, till the consumer has to pay dear enough, to my certain knowledge. But if the small producer could sell direct to the consumer, he might realize more than he now could, even if the consumer paid less than he now does. An intelligent American, resident of Vienna, made the remark, when speaking of this subject, that if Fanueil Hall market were burnt to the ground and the open market system introduced in its place, it would be far better for the people. I do not know but there is much truth in his remark.

As I was thrown very much among musicians during my stay in Vienna, I attended the opera, of course, though, I must confess, quite as much for the sake of hearing German, as for the music. From either point of view I was amply repaid, for the music was superb, so far as I could judge, that is, it pleased me, and I regarded no time lost when I could be listening to my favorite gutteral German.

Having heard and read so much of the Danube, and of Hungary, I determined to take the boat down the river, to Pesth, and return by rail to Prague. We started early in the morning, and a beautiful morning it was, and were soon fast gliding down through a level, flat, and rather uninteresting scenery, the river winding and shallow for many miles, and lined with willows and shrubbery.

It was in the midst of an excessive drought; the first I had found since travelling in Italy. The dry sandy soil seemed thirsting for rain.

The boundaries of Hungary are not far below Vienna. We pass first the little island of Lobau, containing the remains of the great works built by Napoleon to deceive the enemy as to the movements of his army, and soon came to the ruins of the old castle of Theban, near the junction of the river March with the Danube. Here the river narrows, and the Carpathians extend down almost to the castle on the north, while the Leytha mountains are seen at the south. This is the gateway to Hungary. The armies of Europe and Asia have poured through this pass for ages on their marches of conquest. Through this came the bold crusaders on their pilgrimage to the east. Through this poured the vast tide of the Huns over the countries of western Europe. The fate of Hungary and of many other countries has often turned on holding this narrow pass. Here came the Turks from their conquest of Hungary, pouring over the nations of the west, and here the Austrians to the attack of Hungary, in more recent wars.

We are now fairly within the bounds of Hungary. Hundreds of herds of Hungarian cattle now lined the river, driven down for water. I think it is safe to say that I saw fifty thousand head in the course of the twelve hours run of about two hundred miles down the river, and I afterwards had opportunities of a nearer and more careful inspection than I could expect to get on the boat, though we ran quite near many large herds.

This is a remarkable race, and quite uniform in its general characteristics and appearance. Linnæus entertained the opinion that the *Bos urus* was the original stock or type of the races of horned cattle, but others have thought that there was equal ground for supposing this honor to belong to the Hungarian race. There is a striking resemblance between these cattle and those in Tuscany and around the Campagna of Rome, especially in the color, form and expression about the head. All true Hungarian cattle have very long, slender horns, of great expansion. I saw many that would measure, I should think, at least five feet, and possibly six, from tip to tip of the horns. The legs are long, and they move quickly in walking. They may be said to be very good trotters. They are used much on the bad roads of the country, and are accustomed to canter when they come to a pool of water or slough in the road, and as they are hitched or yoked at great length from the cart or wagon, they are on dry land often before the wagon is out of the mud. The general form of the body is fine and graceful, the skin thin, soft to the touch. The color, which is very uniform, is a kind of whitish gray. The flesh is said to be of very good quality. The animal fattens well, and is considered excellent for draught, both from its quickness and its steadiness.

The best Hungarian cows would feed, I should think, to eight or nine hundred pounds, though the average would not be so high. They would vary from six to nine or ten hundred pounds when fat. Though not generally above what we should call a medium size, some of them are very large. The oxen will ordinarily weigh to ten hundred, and the bulls from eight to nine hundred and fifty. The price is for good store cattle from thirty-five to sixty dollars, varying according to quality. Farrow cows will usually sell for about three cents a pound on what they will weigh when fat, and cows in calf about four cents, that is, if the cow is of sufficient size and thrift to fatten to eight hundred pounds, she would sell at about thirty-two or thirty-five dollars.

The mode of yoking is one that is rather common in Europe. There is a kind of padded board placed across the forehead, just under the horns, and the traces are fastened to the ends of that. They push the load by the neck, instead of drawing it by the shoulders, as with us. This is claimed in Europe to be the true philosophical mode, and they maintain that it injures the animal less for the butcher, and that he can exert his strength to greater advantage, and travel faster and longer without weariness than under the yoke. They begin to work the ox at about five years old. After working five years, he will fatten off in a very few months.

The Hungarian cow is not much of a milker, and she does not give that little long. They are seldom milked more than three months after the calf is weaned. The milk is said, however, to be very rich. These cattle are bred in immense numbers on the vast plains of Hungary. Many large owners, it is said, fatten from one thousand to two thousand head a year. In fact Austria is very largely supplied with beef and mutton, as well as with pork and horses from Hungary.

Pressburg was the ancient capital of Hungary. We stopped there on the way down, as it lies upon the Danube, and it was gratifying to have a change of scene from the monotony of the level sandy plains through which the river winds. Now we see a spur of the Carpathian mountains, which separate Moravia from Hungary, stretching away to the north, and the sides begin to be covered with vineyards, especially the slopes facing to the south. The crops hitherto have been mostly wheat, barley and oats, though not many of the latter, Indian corn, some pease, potatoes, beets and turnips, and a good deal of lucerne, on places that appeared to be cultivated, but a considerable portion of the land lying upon the river is sandy and light, often with long stretches of barren sand, or sand covered with willows and wild wood. Lucerne is evidently indigenous to this region, as it often grows with great luxuriance, even where the cultivation is none of the best, and four and five crops of it are by no means unfrequent, three and four being almost universally cut either for green fodder or for hay. Many attempts have been made to cultivate lucerne in the United States, but without satisfactory results. The opinion is that it fails south of Philadelphia, from drought, and at the north, from the severity of winter; but I do not think we suffer more severely from drought than Hungary, if the season, when I was there, was a fair specimen.

Indian corn is nearly, if not quite, as common in Hungary as in New England, and it is used much the same as with us, it being often raised to feed out green. It is estimated that the yield amounts to from twenty-five to thirty millions of bushels, though I do not think its cultivation is so carefully or skilfully conducted as with us. In fact I saw but little good cultivation in the country. There was an appearance of neglect. Weeds among cultivated crops were very common, almost universal, even among vineyards that were yielding well, and which, if properly cared for, would doubtless have yielded better. Whether this state of things is at all due to the political disturbances of which we heard so much a few years ago, or whether it has always been so, I cannot say.

But the bell rings, and off we go. How like a bird the narrow, sharp-prowed boat shoots down the river! Here we come again alongside the sandy plains, and see again immense herds of cattle, and horses, sorry-looking jades, for the most part, and large flocks of sheep, occasionally, but not so often as the cattle and horses. The pastures are evidently over-stocked. Now and then there is an animal among them almost black, and then a red one in a herd, but generally the whitish-gray. The farming is from "bad to indifferent," or only "fairish to middling" for a long stretch. Much of the land is apparently in cultivation, but they run the grain crops into the ground, without intervening with green crops often enough. A proper rotation would bring up the farming of this section, but no land will bear a wheat or corn crop forever, without getting tired of it. They might double the produce by sticking in a turnip crop, or ruta-bagas or mangolds oftener, and get an immense amount of "stuff" for the cattle. Poor creatures, how they feel this drought.

As we approach Pesth the scenery becomes far more picturesque and beautiful. Indeed soon after passing Gran, the ecclesiastical metropolis of Hungary, the river winds through high hills, beautiful forest-clad valleys, between slopes covered with vineyards, and sometimes through deep gorges with high, steep sides. The soil is better than during the earlier part of the day, and the whole aspect of the country, so far as seen from the deck of the steamer, more interesting. I am told that some of the land, when first ploughed up, will produce from thirty to forty bushels of wheat to the acre; but I do not suppose, with the bad farming which is generally prevalent even here, that more than twenty or twenty-five bushels are got on an average.

It was just after dark when we arrived at Pesth, and passed under the truly magnificent new bridge which spans the Danube, here fifteen hundred feet wide, wonderful for its length, its solidity and the beauty of its architecture. Here is a broad and beautiful quay along the noble river, and every thing has the appearance of life and activity natural enough on the landing of a boat-load of passengers all fresh from the capital.

My window looked out over the Danube and the pretty town of Buda just across the bridge, and the first excursion I took was over that same bridge and through a deep tunnel on the other side into the heart of the town, where I attended church. Buda is a town of thirty-five or forty thousand inhabitants, and Pesth of seventy-five or eighty thousand. Above the former city rises the Blocksberg, an elevated fortified peak which commands a fine view of both cities and of a broad landscape. Pesth is rather low and flat, but its streets are wide and clean, its shops, many of them, very fine, and attractive. It has two theatres which appear to be well patronized and a council house from whose lofty, square tower there is a fine view of the whole surrounding country. There is a curious church called the Hauptfarrkirche, which I attended. The priest was in the midst of an animated address, in the Hungarian language, over a beautiful young lady who was kneeling before him surrounded by a crowd standing about in respectful silence. As I could not understand a word of what he was saying, I just made "note on't," as Captain Cuttle would say, and walked out.

There is a peculiarity here which is quite common in continental, one might almost say, in European cities. It is the apparently total want of observance of the Sabbath. The shops are open and every thing appears to go on as usual, except that the people are perhaps a little better dressed than on other days. I saw on a beautiful Sunday morning, in Pesth, as many as two thousand market women, and many men with wares of various kinds for sale. There every thing, I could almost say, that the imagination could picture as salable, was offered and sold. Some had fruits, flowers, vegetables, meats, and other eatables; some had old clothes, old iron, tin, brass, cheap jewelry, old rags, shoes, gloves, hats, and others, a thousand other varieties. This was upon one long, broad street, and it was full of them, middle, sides, and both ends for a long distance. This I supposed sufficient to supply a city of eighty thousand inhabitants with every thing they could want to eat, drink, wear, or use in any other way, but much to my surprise in passing on to another broad street by the river, I came across, I should think, as many as a thousand more, engaged in selling the same infinite variety of articles. They were sitting and standing over a very large part of the street or square and formed a decidedly picturesque group, some with their curious costumes, some with scarcely any costume at all.

The Hungarian gentlemen wore the dress not wholly unknown in this country since the advent of Kossuth and his unfortunate companions, with an abundance of lace, tight leggings, and Hungarian hat. Most of them understand and talk German, many of them well, but the majority of the people if they talk it at all, speak it with a very marked provincialism.

The grapes I found in Hungary were by far the best and most delicious, and the cheapest, of any in Europe. Possibly it was owing, in part, to the fact that, it being later in the season, they were riper, but probably the soil and the hot season had much to do with it. In Switzerland there had been frequent rains, and so in most other parts of Europe, and this has an injurious effect on the flavor of the grape and of the wine made from it. In a wet season there will generally be a greater abundance, but an inferior quality, of wine; and this accounts for the fact that the vintage of some particular years is so much more celebrated than that of others. But to whatever cause it was due, whether to soil, season or variety, the grape was the finest and the most melting I ever tasted. Very large and splendid clusters could be bought anywhere for three or four kreutzers, or two or three cents.

With such grapes common everywhere in Hungary, cultivated as they are by every peasant, it is not surprising that the wines of the country should be so popular. Of the thirty or forty varieties made here, the *Tokay* is probably the most widely known. It is, like most of the wines of the country, the pure juice of the grape, the practice of adding alcohol, common in other parts of Europe, not being followed here. The grapes from which the Tokay is made are allowed to get dead ripe on the vine, when they are picked and put over a large strainer, to press out their own juice. This forms the *extract of Tokay*, a thick, sweet wine, said by some to be the most perfect wine in the world. After this extract, old wine is poured upon the pulp, and a second sweet wine is produced. Hungary was celebrated for its wines more than two thousand years ago.

There is the stupidest waste of labor from the want, in part, of suitable tools to work with, and often from want of knack, both throughout Hungary, so far as I saw it, and in Austria. It was really often amusing to see what labor it required to accomplish the simplest tasks. Two men and a boy with hoes, would do less than a single man would have done with a good shovel.

Generally speaking, the implements of agriculture are very inferior in this part of Europe, and there can be no economy of labor with bad implements. I did not see on the continent an axe to be compared with even the worst that comes from the machines of the Douglas Axe Company. One difficulty they have to contend with is the want of proper woods to make into handles. They have none of the hard, solid, and flexible woods like our hickory. Who could make a first-rate axe handle of black walnut? I do not think we fully appreciate the immense advantage the variety and high quality of our forest trees give us in the construction of all machinery which requires the use of wood. They enable us to attain strength and durability with lightness and symmetry, to an extraordinary degree; and the want of these same species of timber explains, in part, probably, the little progress that appears to have been made in agricultural mechanics in some of the continental countries. Still, the large land proprietors are introducing many new and improved agricultural implements from abroad, on account of the difficulty of procuring labor, since the abolition of the *robot*, or peasant tenantry, whereby the work required on large estates was performed by the peasants as part of the tax which the old laws imposed upon them.

Pesth is the centre of some of the largest cultivated estates in the Austrian empire. The land, indeed, is mostly held by very large proprietors, and such has been the national and family pride of these large owners in keeping the estates in their own hands, that they have not been developed as such estates have been in England by tenants, but tilled by serfs till within a very few years, the peasant tenure system not having been abolished till the Revolution of 1849. Previous to that time the land owner was not obliged to pay for the labor upon his estates, the size of which varied from five thousand to a hundred thousand acres. Down to 1791, the peasant was in a position not much better than a slave. If he occupied land under a large proprietor, he had to pay in kind one-ninth of the produce, and fifty-two days of labor, with a team of horses or oxen, or one hundred and four days' work without a team, and that secured to him an acre and a half, just round his rude cottage, for his own use, and the right to pasturage in common, with sufficient wood for fuel. He was liable for all the government claims for taxes on the land also, which he had to pay, and a quit rent of one florin for his house. This, with slight local variations, was the almost universal tenure of land throughout the country.

It is not at all suprising, therefore, that agriculture was in a very primitive state. Why should people who had not, and could not hope to have, any permanent ownership or interest in the soil, exert themselves to bring out its productive powers? And, on the other hand, how could the large proprietor devote that careful attention to details sufficient to develop the resources of fifty or a hundred thousand acres? It is evident, however, even on a casual inspection, that much of the land is of great natural fertility, and that it only needs proper cultivation to make Hungary one of the finest agricultural countries on the continent.

But the abolition of the peasant tenure of land, in 1849, has already had its effect upon the agriculture of the country. The land owner has now to pay for the labor on his farm, and it has become an object to economize by the introduction of improved implements. Still, changes take place slowly in a rural population, especially in Europe, and the implements in most common use are but very few in variety, and, for the most part, of the rudest description. It is by no means uncommon to see the light lands, especially in the more southern provinces, cultivated by a harrow only made of black thorn bushes and tied to the tails of the small horses which are driven back and forth. This has the effect to scarify the surface, when the wheat or other crop is sown broadcast; and, if it needs weeding, it is done by women and children, with no other pay than the weeds, which they want for the pigs.

The horses I have already spoken of as rather a small and ill-looking race generally, but whether that is due to the use of the English stallions which have been pretty extensively introduced into this part of the continent and crossed with the common stock of the country, or to bad and insufficient feeding when young, I cannot say. The animals look "hard," and are called hardy. They are kept in immense droves upon the plains, and are seldom fed till three years old, when they are worked. They are more spirited than they look to be at first sight, however; and, though rather small, many of them are, on the whole, pretty well formed, with fine legs, good chests, bright, intelligent eyes, and they travel off well before the uncouth wagons of the country.

The sheep are, for the most part, grade Merinos. This breed was first successfully introduced into Hungary by the empress, Maria Theresa, in 1773. She imported a flock of three hundred and twenty-five ewes and rams from Spain. Attempts had previously been made by the archbishop of Gran to acclimatize this breed there, but without success. The immense flocks of fine-woolled sheep now spread over Hungary and Bohemia are largely due to the first importation of the empress, though subsequent additions were made to the original stock which was kept pure, crosses being made by the use of Merino rams and the ewes of the common stock. Having been breeding fine-wool so long it is not remarkable that a good deal of it is of the very first quality, but the mutton does not amount to much. That it is not a favorite dish among the Austrians is possibly owing, to some extent, to the fact that as wool has always been regarded as of primary importance among the large landed proprietors, no attention has been paid to improve the mutton breeds, and they often keep their rich wool-bearing Merinos till they are too old, and tough, for the sake of the wool. It is not surprising therefore, that Austria exports large quantities of fine wool. The exportation amounted in 1850 to thirty-two million pounds, to say nothing of the quantity used for home consumption.

I believe they are beginning to put a little more size upon their sheep for the purpose of making them more valuable for the butcher, and becoming content to produce a little coarser quality of wool. It must not be supposed that the old-fashioned native Hungarian sheep have been entirely rooted out, or that they have all been "extended" by the Merinos. Many of the peasants still keep them, especially in Transylvania, on account of their being hardier and producing more and better mutton, and more, though a coarser wool. They give much more milk also, which can be sold at a high price. And then in some parts of the country they make cheese of this sheep's milk, while the skin, with wool still on, is worn by them as clothing. I saw many pitiable looking objects in this dress. Indeed it is a favorite clothing of the peasants in some parts of Hungary. The old "natives" have very long wool, often almost dragging on the ground, notwithstanding their long legs. Their horns are also long, spiral and erect. They are kept out most of the year and run on the mountains under the charge of shepherds. They will yield, it is said, about fifteen or twenty pounds of cheese a year per sheep, and from four to six pounds of unwashed wool.

Of the pigs that I saw in Hungary I cannot say much. I am inclined to think the population is to a considerable extent Jewish, and that they eschew pork, in which I think they are right; otherwise it is probable that something would have been done to improve upon nature, and the specimens that came under my observation did not lead me to the conclusion that this had been the case. They gave evidence enough that they were capital subsoilers, and that if they could have their way the agriculture of the country would not long manifest such a deplorable want of this characteristic operation of good farming.

Passing by railway through Silesia, we see a country now highly cultivated and productive and then apparently neglected and ill used, and come to Prague, the capital of Bohemia, now a dependent of Austria. Prague is a principal seat of an extensive and important commerce in glass, that beautifully colored, known as Bohemian glass. It is an attractive city of nearly a hundred and fifty thousand inhabitants, situated upon the Moldaw and stretching a long distance on either shore. There is the old bridge, the scene of many a hard struggle, over which poured the bold forces of Wallenstein, lined at every four feet with statues battered and broken in many a siege; among them old John of Nepomuk, the patron saint of Prague, whose mausoleum is to be seen in the cathedral. Crosses and images, indeed, line the road and crown the hill tops all through the country. There is also a beautiful chain bridge. Wallenstein's palace, and the lordly castle that overlooks the city, are worthy of a careful visit.

The railway to Dresden lies through the Saxon Switzerland, as it is called, down the beautiful scenery along the Elbe. It is a rough and picturesque country, capable of cultivation but little of the way, and therefore not by any means agricultural in its character. Dresden has been called the Florence of Germany, and if there is any city that deserves the comparison, this may as well claim it as any other, for in beauty of situation and in the richness of its collections of art, it probably comes nearer to it than any other. It is the capital of the kingdom of Saxony, lying on both sides of the Elbe, and containing something like a hundred and thirty thousand inhabitants. I stopped here nearly a week, at one of the cosiest little inns, *Das Kleine Rauch Haus*, and as I had come with high references from Vienna, they gave me the nicest room in the house, and enough to eat and drink.

The first step in the morning was a visit to the Grüne Gewölbe, or Green Vaults, a wonderful collection of the precious stones and works of art of the Saxon kings, under the royal palace. These rare jewels and exquisite carvings are worth many millions of dollars. The old Saxon princes were among the richest in Europe, as well as the most powerful, and these costly and valuable treasures remain as an evidence both of their wealth and taste. The collection is the richest to be found anywhere in Europe. Indeed, it is said that neither the gorgeous, dazzling magnificence of oriental despots, nor the magic productions of Aladdin's lamp in the eastern tale, could surpass it. The collection consists of exquisite bronzes, carvings in ivory, Florentine mosaics, gold and silver plate and carvings, agates, crystals, cut gems, carvings in wood and enamel. One single piece, representing the *Court of the Great Mogul*, consists of one hundred and thirty-two figures, all in pure gold enamelled, and cost the artist eight years of labor, and eighty-five thousand dollars. Two goblets of cut gems, are valued at six thousand dollars each, and every thing else in proportion. There were two rings which had belonged to Martin Luther—one a cornelian bearing a rose, the other his enamelled seal ring, with a death's head. The largest sardonyx in the world, probably, is here. It is oval, and beautifully regular. The largest sapphire, uncut, was the gift of Peter the Great. Then there were emeralds, rubies, pearls, diamonds, &c. The contents of the diamond room alone, it is said, would pay off all the national debt of Saxony.

A party of six usually visits this collection at a time, as the entrance fee for one is the same as for six. When our party registered their names, as all have to, I noticed one gentleman put against his name, New Orleans, and so I kept my eye on him. As soon as I could meet him in the court of the palace, I made bold to accost him.

"You come from New Orleans, do you not?"

"Ya!" and I saw he was German.

"Secesh?"

"Union to the backbone."

"You're my man," and from that hour I stuck to him while I remained in Dresden. I ought to have remarked before, that I left Mr. Smyth in London, in August, after arriving from Ostend, and that my rambles after that were alone, except the chance acquaintances which I constantly made, like the above.

We visited the galleries together. Here is the original of the *Madonna di San Sisto* of Raphael, purchased of the convent of Piacenza for about forty thousand dollars. Too many other choice works exist here to make it practicable for me even to name them. We lingered long here, and returned again and again. There is probably the largest and finest collection of ancient armor here that exists anywhere in Europe. It gives a very complete idea of the mode of warfare of the Middle Ages.

The country from Dresden to Berlin is flat and uninteresting, the land apparently poor, for the most part, and so far as I could see, not particularly well cultivated. Not so the gardens about Berlin, which were very attractive.

Prussia stands at the head of the German States. It is the most extensive and the most powerful nation, and Berlin, I suppose, prides itself as one of the most refined capitals in Germany. Nevertheless I did not find so much to admire there as I did elsewhere. Its art collections, though extensive, do not seem to me to compare favorably either with those of Munich or Dresden. But the city itself is laid out on a large and generous plan. The finest street, *Unter den Linden*, is one of the most splendid avenues on the continent, out of Paris; and its great *Thiergarten*, or park, thickly set with chestnuts and other ornamented trees, furnishes a delightful place for recreation.

Nearly every other man one meets is a police officer or a soldier, or some other government employee. Little liberty, it seems to me, is left to the people; the preachers, the teachers, the municipal officers, and all those who exercise any authority, are appointed, I believe, exclusively by the government. There is, therefore, a great gulf between prince and peasant. But an effort has been made to attach the people to the government by throwing every facility for the acquisition of real property in their way, by the subdivision of landed estates.

France seems to have set the example in the minute subdivision of lands, a result, in part, of the reaction which took place at the period of the great Revolution of 1789, when a law was enacted which led to the sale of the immense estates of the feudal nobility as national property, and which were soon parcelled out into small estates. Great encouragement has ever since been given to the poorer cultivators of the soil, the peasantry, to become owners of land, and hence has resulted an almost universal desire for such ownership. They have literally run the system into the ground, and infinitesimal strips of earth are now owned and cultivated as farms by those who have to mortgage the little land they own to keep their heads above the surface of the soil they cling to with so much tenacity. The number of these land-owners, at the present time, in France, is said to be over eleven millions, while the number in England and Wales is, perhaps, not more than two hundred and fifty thousand.

France, therefore, may be considered as the type of this system of small holdings, which has become rather common on the continent, as England is the type of the opposite system, that of large holdings. Minute division, or subdivision, obtains in the one, immense aggregation in the other. Curious as it may seem, both may be traced to the same source, the French Revolution, for before the war between England and France the number of small land-holders in the former country was very great, vastly greater than at the present time, and they formed a class possessing very great social and political influence. Under them the land was but poorly cultivated. They were not progressive, but followed in the track of their fathers, hated "book farming," were slow to experiment, and thought him a fool who did. They had got into the ruts, and nothing could get them out, while they owned the land and had their own way.

Then came on the war, involving immense expenditures, requiring large revenues and largely increased taxes, which fell most heavily upon landed property. The question naturally suggested itself whether it would not be better to sell land and become a tenant farmer. With many it was answered in the affirmative, from mere economy, with many others there was no alternative. On the other hand, the large landed proprietors, the moneyed aristocracy, stood ready to purchase, and hence the rapid consolidation of estates, the absorption of the smaller in the larger, till the number of land-owners has become comparatively small, while in France the system of minute subdivision has gone on multiplying the number of land proprietors, without leaving in their hands a requisite amount of working capital to make their lands productive. Nothing has been more clearly shown in the progress of English agriculture, than that capital is as essential to the full development of the productive resources of the soil, as to that of any other art or business of life, and no doubt the great want of capital among the smaller land-owners will explain the backward condition of the agriculture of France.

Prussia imitated the example of France, and broke up the old régime, the system of large landed estates, more than half a century ago, by abolishing the system of serfdom, or peasant tenantry, and opening the way for the purchase and ownership of land among the peasant classes, for the purpose of instilling into them an interest in the institutions of the country and enabling the government to raise armies the more readily and carry on the expensive wars in which the country was at that time engaged. The war with Napoleon, and the first edict of 1807, began to loosen the bonds of serfdom, which was accomplished more completely in 1810, but not till 1821 did the last vestige of this feudal serfdom disappear entirely. The people have not, therefore, been sufficiently long emancipated to comprehend and enjoy the full extent of their rights. But the government still keeps them in tutelage. An army of three millions of government officials still holds the people in a kind of bondage from which the free people of New England would shrink. These officials do not spring from, nor are they responsible to, the people. The government appoints the police, the clergy, the school-master, and, in fact, the most petty village official, who is bound to think and act as the government dictates, or submit to loss of office, and with it loss of bread. The whole system of social organization and of education is eminently military. The so much boasted system of education is designed to make an efficient military.

With us every thing springs ultimately from the people. Even judges and other officials appointed by the executive, for the time being, must be regarded as coming indirectly from the people, since those who appoint them are elected by the people. Rotation in office is the principle, carried, perhaps, too far, and to the public detriment, with us; but better, infinitely better, than the office for life system in all parts of Germany. The whole system is calculated to keep the people always children, to banish all independence of action and freedom of thought. Every thing moves by routine. Such a thing as the town meeting for deliberation upon the management of local and municipal affairs, in New England, so important, as educating the people in their own government, is not known in any part of Germany, nor, I think, in any part of the continent, unless it be in the free cantons and communes of Switzerland.

The system of minute division of lands exists, therefore, in Prussia, and most other parts of Germany, as the result of the revolution, attended with so much bloodshed, in France; accomplished so silently, and by the edict of the king, in Prussia, and soon imitated in the other kingdoms and principalities of Germany.

The agriculture of Prussia, as compared with the rest of Europe, is not in so advanced a state as I had expected to find it; and the condition of things just alluded to may serve, in part, to explain the reason. There can be no doubt that England takes the first rank, of all the European nations, in the advancement of her agriculture and the production of food for the support of man. After her come Belgium, Holland, Switzerland, Lombardy, Saxony, and Bohemia. In the third rank comes France, where so much has been done to develop the sciences on which an intelligent knowledge of agriculture is based, but which, for some reason or other, has not advanced so far in the application of those sciences as some other countries which learned them first of France.

Leaving Lombardy out of the question, and the rest of Italy may take its place in the third rank, with France, in respect to its agriculture; and then would come the other nations, like Prussia, Bavaria, Austria and the other kingdoms of Germany, Spain, &c., and lastly, perhaps, Turkey and Greece. In this classification reference is had to production in proportion to extent and population. In the culture of particular crops, it may be that Prussia may equal some of the other nations. In many parts there are special crops, like the beet-root, cultivated for sugar, and the vine, so luxuriant in the Rhenish provinces. Neither of these have been, or could be, cultivated so successfully in England. France is largely engaged in both industries. But it is the aggregate production of human food that furnishes the basis of judging of the agriculture of any country, the capability of supporting the densest population, and the perfection of the means by which this result is attained.

The route from Berlin to Paris is by no means attractive, though the soil in many parts indicates a capacity of production not yet sufficiently developed. The country is, much of it, flat, the scenery by no means picturesque, and the objects of attraction few.

It is one full day to Cologne, and this brought me for the second time to this old Roman city, and gave me an opportunity to see it under greater advantages than at first. It has been called the Rome of the North. The cathedral is the great centre of interest, both from its antiquity, having been begun in 1248, and its magnificence. It is one of the grandest and most stupendous designs of Gothic architecture in the world, though still uncompleted. It is in the form of a cross, supported by sixty-four great columns and semi-columns, or, including the portico, more than a hundred. The four columns in the middle are no less than thirty feet in circumference.

It was designed to have the two columns each five hundred feet high, but they have not been finished. The great bell weighs twenty-five thousand pounds. The length of the body of the church is four hundred feet, and the width one hundred and sixty-one. The shrine of the three kings, or magi, who came from the East with presents for the infant Saviour, contains their bones in a solid silver coffin, gilded, and curiously wrought, and surrounded by pillars adorned with figures of the apostles and prophets. Treasures of immense wealth once decorated it, but they were partly lost during the French Revolution. But the jewels, precious stones, gems, cameos, and rich enamels which remain, give some idea of its riches and magnificence originally. They say its treasures are still worth $1,200,000. The heart of Maria di Medici is buried under a slab between the high altar and the shrine of the three kings. In the sacristy they show a bone of St. Matthew, while in the church of St. Ursula there are the bones and skulls of eleven thousand virgins. These frightful relics fill the church, are set into the walls and the ceiling, buried under the pavement, and some of them in glass cases, some of them in silver, in a room called the golden chamber, and with other relics such as a link of St. Peter's chain which fell off when the angel appeared to him in prison. Also one of the stone vessels which held the water that was turned into wine at the marriage feast of Cana and others, all which the credulous are expected to believe as genuine.

Notwithstanding the fact that Cologne is the city of perfumes, it cannot be considered as especially clean, as one would naturally expect to find it. Still it is interesting for its historical associations, and for its quaint architecture. As we leave it for Paris, the fields are covered with roots and other crops under a high state of cultivation. For miles the country seemed to be a perfect garden.

"What vast fields of vegetables! What do you do with so many?" I asked of a Frenchman by my side.

"Oh, those are beets—the white Silesian sugar beet—and we use them for making into sugar. Most of the sugar you will have in France is made of them, and you will find them in great abundance for miles around Paris, and indeed in many parts of France."

That was truly the case. Not only did thousands of acres appear to be covered with them both in France and Belgium, and some parts of Germany, but often did we see great cartloads lining the roads from the fields and the farms, moving like processions towards the black and smoking mills where the sugar is manufactured.

" How long have you been so extensively engaged in making sugar from beets ? "

" Oh, for half a century or so. A man by the name of Margraff first discovered that the sugar found in the beet-root could be crystallized, and a German by the name of Achard soon suggested the extensive cultivation of this plant as a means of obtaining sugar by somewhat the same processes as from sugar-cane. When these facts became known to Napoleon the First, he made a decree which really prohibited the importation of sugar to any extent into France and the other countries which he at that time controlled, and this gave a tremendous impulse to the cultivation of sugar beets and the manufacture of sugar. It was made in a rough way at first, but necessity led to many improvements till now we think the processes of making sugar from beets are more perfect than those of the sugar-cane. It was a subject for the investigation and ingenuity of scientific men, and the application of scientific principles."

" Don't they cultivate any other varieties than the Silesian, for this purpose ? "

" Yes, several varieties have been used for this purpose. One is a long red, which is very different from the Silesian, which is white. Then there is the mangel wurzel, which is probably a cross or hybrid between these two. That is a field beet. Don't you raise it in America ? "

" Oh, yes, we raise that, and the sugar beet, to some extent, but not in such vast quantities as you do here. But is the Silesian so much better than the rest ? "

" Well, we had some time ago a kind of beet with a delicate rose colored skin, that was pretty popular at one time. When you cut it great white and red layers or stripes, appeared to run all through the inside, then there were others which appeared to be a sort of cross or intermediate varieties between the long red and the Silesian, but it was soon found that the white Silesian gave a larger percentage of sugar, and had less water and other waste substances than any other variety. And then again it is not so tender and liable to get bruised in cultivating and harvesting as the others, while it stands the frost and wet better. So it is more valuable for the manufacturer, though it don't produce so large a crop as the mangel, or common field beet.

"Then I recollect a beet called the Siberian, which was round and yellow, and some thought it had a larger amount of sugar, but it was not so. It had the advantage of growing well on a thinner and poorer soil than the Silesian. It is differently shaped, you know, and does not strike down so deep as the Silesian and the mangel. It was a good root for feeding to cattle. A good many large cattle-owners grow it as feed for stock now, as it is very nutritious. But on careful analysis it was found to contain less sugar than the Silesian, and our sugar beet growers prefer to stick to the latter, as it commands a little better price."

"I notice that all the beets on those loads appear to be about the same size, and I should think they were rather small. Do they try to get them of that size? Why don't they grow them larger?"

"A large sized root contains less sugar than a smaller sized one. That is well settled both by our scientific men and by experience in the sugar manufactories. You will find the sugar varies in beets from five to twelve per cent., and the larger varieties not only have less sugar but usually contain more water. It is well ascertained that the usual average of sugar in the Silesian beet and the varieties cultivated for the sugar is about ten per cent., but in the other varieties, like the mangel, the proportion is much less."

"Is the sugar as good as that from the sugar cane, do you think?"

"It is precisely the same in quality if it is well made, and you will find it everywhere on the table, for your coffee, as rich and white as the best lump sugar from the cane."

"How is it about the waste? Is the whole of the sugar of the beet capable of being crystallized?"

"Every particle. The process of manufacture is now so perfect that there need be no loss; but practically in making sugar in France, a part of it becomes molasses or sirup, which does not crystallize, so that the actual amount of sugar is, perhaps, not more than five or six per cent., or about one-half of the amount present in the root, but the other half becomes molasses in the process of sugar making, and is used as such."

"You say the smaller roots contain more sugar. I should think the weather and soil would have some influence on that."

"Oh yes, the sugar is affected by a great many circumstances. The season, whether dry or wet, the kind of manure used, the soil, the time of harvesting, and other things, have as much influence, perhaps, as the size of the roots and the variety. Very strong and forcing manures make a ranker growth but the percentage of sugar will be less. Saline manures generally have to be used with caution. Common salt will promote a great growth, but though useful in small quantities it would lessen the proportion of sugar very much, if applied too largely. And so forcing, or ammoniacal manures add to the proportion of water in the root."

"Do they always take the roots directly from the field to the sugar house?"

"They generally do. There is more sugar in the fresh root. You take a root fresh in October, and you may find, say eight or ten per cent. of sugar, but let it lie till January, and you will have but six or eight per cent.; and if it lies till February it will contain, probably, not more than four or five per cent. at the most. I suppose the sugar changes into woody fibre in the process of drying too much."

"How do they make the sugar?

"The roots are perfectly cleaned or washed in a machine, water being used without stint. Then they go into a simple cylindrical machine worked by steam or water where they are rasped or grated into a perfect pulp; to prevent clogging a little stream of water is made to trickle down over the rasper when in operation. Then they put the pulp into bags and pile the bags up under the press, each bag separated by a perforated plate from the others, and put on the pressure, at first light letting the juice run off and gradually increasing till the whole is extracted. The bags are taken out once or twice in the process and put in differently so as to expose all surfaces and corners to the pressure. The details differ somewhat in different manufactories, but they are in the main the same."

"What proportion of the juice can they get out?"

"They usually get not far from eighty per cent. of juice, and perhaps from four to eight per cent. may be left in the pulp which now takes the form of a cake. Then the juice is clarified which is usually effected by the addition of hydrate of lime during the process of evaporation. To evaporate the juice to the point of crystallization it is put into large pans heated by steam."

"How much lime is used to clarify the juice?"

"It depends a little upon the degree of impurity in it, but ordinarily about five or six parts of lime will clarify it perfectly. The impurities, consisting of various substances, rise to the surface in the form of scum and are removed. The hot juice is run through animal charcoal and rendered quite colorless. When concentrated sufficiently, which is known by its specific gravity, it is run into moulds to crystallize."

"What becomes of the refuse or cake, after the juice is pressed out?"

"That is broken up and given to cattle. It is worth something for feeding, and in mixture, or in connection with other substances possesses considerable nutritive properties."

"What is the ordinary yield of sugar beets per acre?"

"Not far from twelve tons, but it varies considerably according to soil and mode of cultivation."

Thus we journeyed on towards Paris, through an interesting country, stopping at Aix-la-Chapelle and other prominent towns on the way.

The recent growth of Paris is quite wonderful. The emperor means to leave his mark upon the city, whatever may be the final summing up of his eventful career. The work upon the new and magnificent boulevards has called to Paris a great number of mechanics, and the population has increased, while that of the country has actually fallen off, it is said, during the last ten years. Whether the prosperity and happiness of the whole has been promoted or not, by this change, may be a matter of doubt, but certain it is that all Frenchmen are proud of the greatness and splendor of the capital.

My room for two weeks was directly opposite the garden of the Tuileries. The Louvre, with its rich and extensive art galleries, adjoins. I will not attempt to give even a faint idea of these collections, nor of those of the Luxembourg Palace and its gardens, nor yet of the Hotel de Cluny, or the Palace des Thermes, the most ancient part of Paris, peculiarly interesting for its rare mediæval productions both of art and mechanics.

That great storehouse of natural history, the Jardin des Plantes, with its endless halls of botanical, mineralogical, anatomical, and zoölogical collections, its lecture rooms, where the people have free access to the instructions of the first scientific men of France, and its great variety of living animals and plants, it would be equally useless to attempt to describe. The same may said of the Jardin d'acclimatation, connected with the Bois de Boulogne. The arrangement of its animals, birds and plants is admirable.

The Conservatory of Arts and Trades is a school on the most extensive scale for the industrial classes, embracing a great collection of models of agricultural buildings and implements, not only of France but of foreign countries, where accomplished professors give lectures upon the application of the sciences to the mechanic arts, at the charge of the government, access being free to all.

I had the rare fortune to gain access to the Conciergerie, where Maria Antoinette was imprisoned till led out to die; where Robespierre and the Girondists spent their last days waiting for their turn at the guillotine. The great attractions of Versailles, with its landscape gardening and its costly fountains, which I saw in full play, the markets of Paris, the imperial library, the tomb of Napoleon in the church of the Hotel des Invalides, and a thousand other objects which adorn this city, offer many points of interest, but I must forego the temptation to touch upon them here.

I arrived again in London by way of Dieppe and Newhaven, towards the end of October, and in time to renew my visits to the International Exhibition, the British Museum, the Zoölogical Gardens, and the Kensington Museum, and to hear that celebrated preacher, Mr. Spurgeon. The Kensington Museum had on temporary deposit, an infinite variety of the most valuable plate and other rare articles from the palace and the lordly mansions of the nobility, many of them of great antiquity and of the rarest and most costly description. The watch, carried for several years by Oliver Cromwell, and other things of equal interest were there.

We will recur for a moment to the latter part of August after my first return from the continent, when I left London for the midland counties and the north. Necessity compels me to be very brief. Passing through Oxford, I spent some hours in visiting the University, the Bodleian Library, and other objects of interest, and continued on to Stratford upon Avon in Warwickshire. The house of Shakespeare is still standing, now in a good state of preservation, and so is the house where he went to school, and where he paid his attentions to Ann Hathaway. He lies buried with most of his family in the church of Stratford. In company with a gentleman to whom I had letters, I rode over the neighborhood, and saw something of the excellent farming of that part of England, then visited Warwick Castle, Guy's Cliff, and the ruins of Kenilworth.

This is the country of the long-horns. I believe Bakewell laid the foundation of his herd and dated his improvements from cows bought in Warwickshire. This county is highly cultivated, picturesque and attractive. The improvements here during the last quarter of a century have been very marked, and the aggregate products very largely increased. The improved implements of husbandry, the hay-tedder, the mowing-machine and the horse-rake are generally introduced, and drainage is regarded as of the highest importance.

Stopping for the night in Birmingham, gave an opportunity to see the town, which possesses no very great interest, and in the morning I was on the way to Derby and Nottingham. The farming of Nottinghamshire, like other parts of England, has vastly improved by the introduction of drainage and the erection of good farm buildings, for the proper shelter and feeding of stock. Liquid manure is saved and applied here in many cases to great advantage.

Boston in Lincolnshire I visited rather from curiosity, to see where the founders of our metropolis came from, than from any expectation of finding any improved agriculture in its neighborhood. It is an old and not very interesting city, though it gives evidence of great former prosperity. Introducing myself to the mayor, he accompanied me to the remarkable old church, and introduced me to the clerk and the rector, who very kindly gave me all the information in their power with regard to the history of the parish. The Cotton chapel, now connected with the grand old church, was presented by some citizens of Boston, Massachusetts. After dining with his Honor the Mayor and several of the aldermen whom he had invited in, I proceeded to Lincoln, the shire town, and attended service in its old and interesting cathedral, when it occurred to me that I had missed Chatsworth, which I should have taken while at Birmingham. That was a place I was particularly desirous to see, and so taking the train for Sheffield, where I took time to visit some of the larger cutlery establishments, and left the smoky town early in the morning for Chatsworth.

The seat of the Duke of Devonshire, in Derbyshire, is probably one of the finest of the kind in England, both in its interior decorations and its beauty without. The noble mansion is full of interest, containing fine galleries of paintings, magnificent statues and vases of the most costly description, and many souvenirs of great value. The library contains thirty or forty thousand volumes. The great painting of Flying Childers hangs on the wall of one of the rooms. The estate at Chatsworth contains thirty-five thousand acres, six thousand around the house are laid out with very great taste. The Duke, it is said, owns ninety-five thousand acres in Derbyshire. The gardens of Chatsworth are very extensive and laid out with consummate skill. The kitchen garden of twelve acres contains many fine graperies, which were full of fruit. The great glass conservatory, built by Sir Joseph Paxton, and which furnished the design for the crystal palace of 1851, is three hundred and eighty-seven feet long, four hundred and seventeen broad, and thirty-seven feet high, and contains seventy-six thousand square feet of glass, and seven miles of pipes for heating with water. It contains an aquarium for water plants. All the plants are of the rarest description. The duke sent a special messenger to India to get one flowering shrub, which it is said is valued at ten thousand dollars. A great fountain throws water two hundred feet high. But the splendid artificial cascade is perhaps the most remarkable feature of the landscape garden. The water falls first from a very high hill down a precipice of twenty feet, when it is hidden among trees till it is seen coming down another precipice of thirty feet, in a different direction; then it pours over the top of a high tower, in a single sheet of sixty feet, and boils up over a grotto, forming several beautiful jets, when it comes down in a rushing cascade a kind of stairs, forming an inclined plane of two or three hundred feet, and sinks in the ground at your feet.

There is close by an artificial grotto, where a stone weighing ten tons is so nicely balanced as to be turned with ease with one hand. The park is magnificent.

Up over the Derbyshire hills, the most romantic I saw in England, is the beautiful little town of Buxton, where I passed the night, and visited Manchester next day, then proceeded to Leeds and York, the seat of a famous cathedral and of the Archbishop of York.

On my way to Edinburgh, I stopped at Durham to see the cathedral and the old Dun Cow, that we read of in history. There she stands, carved many, many years ago, in one of the projections of the grand old cathedral, two of her teats broken off short and another half gone, the milkmaid with a bucket of milk on her head, while the cow looks for all the world as if she might have filled it again as easily as she did the first time. Newcastle upon Tyne is a much larger and finer town than I expected to find.

The crops through Yorkshire and Durham were looking badly, on account of the long and cold rains. They were also badly lodged and injured. Covered yards for cattle are adopted to some extent in Yorkshire, and with great success. They furnish shelter and warmth, and preserve the manure. They use them instead of box feeding or tying up.

In Edinburgh I visited the museum of the Highland and Agricultural Society of Scotland. In some respects it is superior to the State Cabinet, as it ought to be, as it is the result of many years, while ours has been collected chiefly in the last five years, but in some respects the Massachusetts State Cabinet is decidedly superior. Holyrood Palace, the home of the unfortunate Mary, queen of Scots, is interesting from its historical associations. But I had greater pleasure in a day at Abbotsford, and Melrose and Dryburgh Abbeys. The distance from Edinburgh to Abbotsford is over forty miles. As I had to leave Edinburgh quite early in the morning, and without a breakfast, I called into a peasant's cot close by the Abbotsford ferry, to get some coffee, and found, to my surprise, they were neighbors of Sir Walter, and that they knew and loved him well. The tenderness with which they spoke of him was quite touching. The good woman said that all the wood they had to burn was bought by the pound, at Galashiels, a village a mile off. Crossing the river, as we had to on the visit to Dryburgh Abbey, seven miles below Abbotsford, the ferryman took in also a fisherman, and I was surprised to learn that for the right of fishing a little distance, not more than a quarter of a mile, I should think, as he pointed out the limits, he had to pay a hundred pounds, or five hundred dollars, a year.

Abbotsford is by no means very imposing, but it contains many relics of great interest, as any thing connected with Sir Walter Scott must be. His study is left as it was, with his writing-desk and chair, the dress that he last wore, the gun of Rob Roy, the pistols of Napoleon, and a thousand other mementos of the past. A massive iron door of the old Tolbooth prison, the Heart of Mid Lothian, is built into the wall of the house. The gardens were simply arranged, but attractive. The remains of Sir Walter lie at Dryburgh Abbey. The heart of Robert Bruce was buried at Melrose Abbey, three miles from Abbotsford. The country in the neighborhood is rough, the farming in no very high state of perfection, grazing and sheep husbandry being the leading pursuits. In the Castle at Edinburgh are preserved the regalia of Scotland—the crown and sword.

From Glasgow I went to Dumbarton Castle, and over Loch Lomond, through the land of the McGregors, who were buried on an island in the lake near the foot of Ben Lomond. The spot where Rob Roy's house stood is near the shore of Loch Katrine. The last wood of his house was made into a chair, and presented to Sir Walter Scott, and I saw it at Abbotsford, but another small house, owned till recently by a descendant, stands on the spot. Loch Lomond is unquestionably the finest of the Scottish lakes. In variety of scenery, extent and beauty, no other can be compared with it. There is no part of it which is not picturesque. Full of the most lovely little islands, covered with wood, and surrounded by bold and lofty highlands—features in themselves attractive—it possesses the additional charm for the readers of Scott, which it derives from fascinating poetical associations. Loch Katrine is one of the most beautiful among the Highlands. Glasgow is supplied with water from it. Near one end, at the foot of Ben Venue is the beautiful little island known as Fair Ellen's Isle, and opposite rises the lofty peak of Benan. We journeyed through the Trossacks—a wild, beautiful glen connected with the scenes in the Lady of the Lake, crossed the brig o' Turk, and arrived at Stirling Castle in the afternoon of a fine summer's day. The field of Bannockburn is not far from the castle, which was itself the scene of more than one hard-fought battle.

At Perth we are in the neighborhood of Birnam Wood and Dunsinane, and in going to Aberdeen and Inverness, we pass many old ruined castles, the battle-field of Culloden, the heath where the witches met Macbeth and Banquo, and many other historical places, to whose history I should be glad to allude, did space permit. Inverness lies at the foot of the northern Highlands, at the extremity of the great Caledonian glen, through which there is an almost endless chain of lochs. It is about seven hundred miles north of London. The country is rough and mountainous, some of the peaks rising three or four thousand feet, bleak and comparatively barren, but picturesque in the extreme. The castle of Macbeth, built by the thanes of Cawdor, stood on an eminence overlooking the town. It has now given place to a court-house. Cromwell went to Inverness in 1651, and built a fort there. Many remains of the Druids are to be seen in the neighborhood. The wild heaths, extending over thousands of acres, are devoted mostly to sheep-walks, while vast tracks are still reserved for deer and other game. We went down through Loch Ness, Lochar, the Caledonian Canal, past the foot of Ben Nevis into Locheil, and came, after a most interesting trip through the Highlands, to the pretty little town of Oban, and so out around the Island of Mull, stopping at Staffa to visit the Cave of Fingal, and Iona, the sacred island where the kings of Scotland lie buried, and among them Duncan and Macbeth. All the region is familiar to the readers of Ossian, and Sir Walter Scott, Campbell, and Wordsworth, and apart from the classic interest which the poets have thrown around it, it is not surpassed in grand and picturesque scenery by any other part of the Highlands. The woolly West Highland cattle are seen in their purity here. A large herd was feeding on the island of Staffa.

It is a full day's sail by steamer from Oban to Glasgow, the route lying through the Highlands and up the Clyde. A farmer from Argyle, which is above Oban and in the Highlands, whom I had met at the exhibition in London, had invited me, earnestly, to visit him, promising to take me all over the country. This gave me an opportunity to explore that glorious region to far better advantage than it would have been possible otherwise, and I regret that I cannot give a longer account of this wild section.

Renfrew and Ayrshire lie to the south and west of Glasgow, and are full of interest in an agricultural point of view. The Ayrshire cow and the Clydesdale horse may be regarded as a most noble contribution to modern agriculture by a section not remarkable for richness of soil or the fertility of its pastures. I introduced myself to the Secretary of the Ayrshire Agricultural Society as soon as I arrived in Ayr and was indebted to him for much civility. The character of the stock and the mode of treatment were so fully stated in my treatise on the dairy, and the observations there made were so fully confirmed that any thing I might say here would be little more than repetition. I was surprised, however, to be informed by the secretary, that they were getting dairy maids from Cheshire and other parts of England, to teach them how to make cheese. The Ayrshire stock is more generally distributed in Scotland than I had supposed. Its popularity and excellence for the dairy commends it to farmers who keep cows for their milk, and good specimens are to be met with in all parts of the country even where other and local breeds predominate. I found the reputation of the Ayrshires very high in all parts of the north.

It is needless to say that I visited the cottage and the tomb of Burns, auld kirk Alloway, the brig o' Doon, and many other spots sacred to the memory of that poet of nature. On the way through Dumfries we pass Gretna Green, suggestive of runaway marriages, and arrive at Carlisle, one of the stations on Hadrian's wall, in Cumberland.

In going south I paid my visit to Chester and Shrewsbury and returned to London for my second visit to the Continent to which allusion has been made in the preceding pages. I intended, and I should be glad, to dwell upon the dairy system of Cheshire which I had the good fortune to see something of, but it does not differ materially from the report upon it which I gave at length in the work on the dairy before alluded to, and any thing I might say here would be mostly a repetition of that.

My impressions of English and Scotch farming are, on the whole, rather less favorable than I expected they would be. There is less difference, I think, between that and our own than we have generally been led to expect. The English farmer understands the necessity of the application of capital to land, perhaps, better than the American, and he has more to apply. Where one controlling mind can direct the improvements upon vast tracts and has the means to forward them, we might naturally expect great results, especially at those points which most strike the eye. But I saw as poor farming in England as is often seen in New England, though less of it. Land is too expensive there to be neglected. Moreover, labor is too cheap to make it necessary that it should be neglected.

A mild climate with frequent rains, through the growing period, gives the country a perpetual greenness and luxuriance which we can only rarely show, however perfect our agriculture may become. For some crops this constant moisture in the atmosphere and the soil is admirably adapted, and the English farmer has had the wisdom to avail himself of the advantage it gives him to raise a vast amount of root crops, and on them to fatten stock for the market on which he realizes his returns.

We can travel in no part of England without seeing the fields and hill-sides covered with sheep. The number in comparison with our own is quite wonderful. In this respect, sheep husbandry, and in the systematic breeding and feeding of stock, in general, it strikes me that English farming is decidedly superior to our own, and that we may learn many a useful lesson from it. Perhaps the same may be said also with regard to the economy and care of manures, the liberality of their application, and the general willingness to make large investments in permanent improvements with a confidence of good returns, but in the mechanical manipulations of the farm, the implements of husbandry, the economy of labor in accomplishing results, I think on the whole we may fairly claim superiority. The farming of the English would not always succeed so well with us, nor would ours with them. Each is better adapted to the circumstances in which it has grown up than the other.

The climate of Scotland is well adapted, also, to grazing and to the raising of roots and those crops which luxuriate in constant moisture. Hence the great success in raising root crops, which grow very far north in great abundance, and oats, which do best in a moist climate and soil. Oats sometimes weigh there as high as forty-eight pounds per bushel, and generally from forty to forty-two pounds, I believe; while with us it is rare that they reach over thirty-two pounds, and if we should use Scottish seed the grain would not fill out as it does in the moist, cold climate of Scotland. When I was there, towards the last of August, there was scarcely a day when it was comfortable without an overcoat, and frequently a shawl was needed in addition. The oats were as green as with us early in July, and the wheat had hardly begun to turn. The grasses were luxuriant. Indian corn, the pride of American products, the king of cereals, could not, of course, ripen in such a climate, nor is there a complete substitute, but root crops supply its place to some extent among stock growers.

With regard to the agriculture of the Continent, the traveller cannot avoid the impression that the system of standing armies is drawing the bone and muscle from the cultivation of the soil, creating large bodies of consumers out of a class which would otherwise be producers, and leaving the land to be worked chiefly by the hands of women. A low state of agriculture in countries naturally rich and favored by a propitious climate, is the consequence. Suppose the six or seven hundred thousand young men drafted from the country into the Austrian army to live in habits of idleness, could be left on the farms,—would they not add very largely to the material wealth of the country? This is the case, to greater or less extent, in most parts of the Continent.

Thus I have tried to give a plain and truthful sketch of what I saw in a trip to Europe. I have written chiefly from notes hastily taken down, with no view to publication, and often when mind and body had been tasked even to exhaustion. It has been my desire to keep the account within the proper limits of a report, and this has prevented the full development of parts on which I might have dwelt with satisfaction. I have occasionally gone aside from the farm, and described sights and scenes other than agricultural, to give interest to details which I feared might be tedious.

My journey was undertaken as a much-needed relaxation from severe and long-continued labor, at a time when my absence could not materially interfere with any official duties, and at my own expense. I trust that the large opportunities of observation it has given me, and the impressions it has left upon my mind, will add to my usefulness in my department, and that there will be found something of value and truth in my wayside remarks.

I have come back more thankful than ever that my lot was cast in New England, and with the impression that in intelligence, enterprise and morality, the elements essential to a happy and prosperous life, no civilized community in the world holds a prouder position than New England, none has greater cause of gratitude, none a heavier responsibility to maintain the institutions of their fathers in their purity, and to transmit them in all their integrity to their children and their children's children.

CHARLES L. FLINT,
Secretary of the State Board of Agriculture.

BOSTON, January 28, 1863.

REPORTS OF DELEGATES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

ESSEX.

As delegate of this Board, I attended the exhibition of the Essex County Agricultural Society, at Georgetown, September 30th and October 1st.

The annual meeting was held on the morning of the first day, and the number in attendance and the interest manifested were in pleasing contrast with some of our agricultural societies, where scarcely a score of members can be induced to attend that meeting, and those manifesting little interest in its results. The commodious hall was filled to its utmost capacity with members and committees, interested in every movement, and ready for the performance of every duty.

The offices of the society are readily accepted, if not eagerly sought; and an effort was made at this meeting so to change the constitution as to prohibit the re-election of any trustee, until he has been at least one year out of office. This measure was not adopted, the society allowing itself, as heretofore, to select from all its member the best men to fill this important office.

The weather and locality were both unfavorable for a large exhibition. Considering these unfavorable circumstances, the exhibition generally was creditable.

The society owns a tent, which, together with the town hall, affords ample space for the exhibition of fruits, vegetables, dairy products, farm implements, &c. This department was under the superintendence of John M. Ives, of Salem, who has occupied the same position for several years. There were twenty entries of butter, and twelve of cheese. Pears, apples and grapes were abundant, and of excellent quality. About five hundred plates of these staple fruits graced the tables, interspersed with several specimens of peaches. Vegetables were few, but of excellent quality.

The exhibition of neat stock was not large, and with some exceptions, the quality of that exhibited gave evidence of want of interest in this department among the farmers of Essex. Of bulls I noticed one thoroughbred Short-horn, from the farm of B. Perley Poore, and the imported Ayrshire bull Irvine, owned by Dr. George B. Loring. Irvine is a superior animal, and the fact that he and others of like quality are, and have been for years, within reach of the farmers of Essex, with the evidence borne by their stock, that their services have not been appreciated and sought after, I think justifies and proves the truth of the above statement.

The horse department consisted mainly of stallions, breeding mares and colts, and gave evidence of a good degree of interest and skill. The entries were, stallions seven, breeding mares eight, farm horses six, colts twenty-one.

The ploughing-match took place on the morning of the second day, and attracted a large number of spectators. The premiums were contested for by eighteen ploughmen, with the same number of teams and ploughs. The ploughing was mostly by oxen, there being but one team of horses. Ten of the teams had two yokes of oxen each. The plough field was any thing but desirable, being quite uneven and the surface covered with a stiff moss. It afforded, however, a much better test of the quality of the plough, and skill of the ploughman, than if it had been a smooth grass plot, and your delegate was compelled to feel, that upon the whole it was a wise selection.

Immediately after the ploughing, the crowd repaired to the church to listen to the annual address, delivered by George J. L. Colby, Esq., of Newburyport. It is worthy of remark, that this society, which has held its annual exhibitions for more than forty years, has never gone beyond the limits of the county for an individual to deliver its address. After the address, members of the society and others, to the number of about two hundred, partook of a collation at the hall of the hotel. This was followed by the reading of reports of committees, interspersed with brief addresses from several gentlemen.

In conclusion, I wish to commend the promptness and energy of the officers of this society, every part of the programme being carried out in full, and at the appointed time.

P. STEDMAN.

MIDDLESEX.

In the capacity of a delegate from the Board of Agriculture, I attended the seventieth exhibition of the Middlesex Agricultural Society, held in the town of Concord, on the eighteenth day of September last. This being nearly or quite the oldest society in the State, and in a very favorable locality for the operations of an organization of the kind, I was naturally led to look for a great degree of success. On the other hand, owing to the absence of a large portion of the enterprising young men who had gone forth to do battle in defence of our country, I anticipated a falling off in the attendance, and to some extent in the number of entries. In each of these expectations I was not especially disappointed. The exhibition in many respects was superior, though somewhat meagre in the number of entries. This was especially observable in the stock department, not one half of the accommodations furnished by the society being called into use. The display of stock on the ground was a very fine one, but as I have elsewhere observed, did not appear to gain the attention to which it would seem to be entitled. This may arise from the fact that to the people of that section, nothing new was presented. The show of fruits was, as everywhere else this season, unusually good. In apples particularly, it stood, in my limited experience, unrivalled. The ploughing match was to all intents and purposes a repetition of previous ones, and a type of those generally occurring elsewhere, not very prolific of results, except to the more fortunate contestants.

The attendance of visitors under all the circumstances was very fair, but I failed to observe that enthusiasm which is apt to display itself in the exhibitions of some of the more youthful societies. This is a subject that has several times forced itself upon my attention. Without any desire or intention to specify the Middlesex, or any other agricultural society in the Commonwealth, and without denying to all of them the credit of every effort to make the most of their opportunities, and especially without under-estimating results in the past, I may take the opportunity to say that it has seemed to me for some time that a number of our older agricultural societies had accomplished nearly all that we have a right to expect of them under existing circumstances. The exhibitions have come to be considered too much as mere matters of course, the forms of which are to be gone through with, and a certain amount of money distributed in premiums, quite a proportion of which really goes for accidental products, for which the competitor is entitled to little or no credit.

This result I believe to be to some extent inherent in the plan upon which these societies conduct their operations. They at first serve a very useful purpose in awakening an interest in their localities, and in distributing among the multitude, the knowledge possessed by the best informed minds. The exhibitions present to the eye of the novice every facility for the formation of an enlarged judgment upon all those matters which especially interest him. Improved animals and other products and processes are thus invaluable in presenting a healthful stimulus to the inquiring mind, and the effect is to increase the knowledge and elevate the condition of community. This effect, however, exhibits itself in a diminishing degree as time passes. After a few years the interest abates, and finally there comes to be mainly a scramble among the competitors for the money distributed in premiums. The reports of committees grow less and less interesting and suggestive, and at last all that is expected even of a committee is the bare announcement of the premiums awarded, without comment, of little or no use to any body except the recipients. I do not say that such is the result in all cases necessarily or really, but only that such is the tendency. In some of the older societies there is, together with favoring local circumstances, a degree of enthusiasm sufficient to resist this tendency, and the good influence of such societies, possesses a more permanent and enduring character.

The question naturally arises, what can be done to remedy this difficulty? Is there any practicable plan through the adoption of which we may hope to obtain more valuable results? It seems to me that there may be. The course at present pursued, when viewed in all its relations, cannot be so near perfection as not to be susceptible of improvement. Such an idea is not consistent with our views of agricultural progress. I believe that the most earnest consideration of this Board is demanded in connection with this subject. The Board of Agriculture is in a high degree the source from which we should expect agricultural ideas to emanate. It should be active to originate and give direction to methodical investigation, that united labor throughout its jurisdiction may be directed to some valuable end, and not individually frittered away without any useful purpose. Being made up of representatives from all the agricultural societies in the Commonwealth, it should know and appreciate the various conditions, needs and capacities of all, and by its combined wisdom, legislate, so far as it has the power, for the best interests of agriculture in its connection with all. It is a subject for serious inquiry, whether, with all the means at command through the liberality of the Commonwealth and otherwise, the results of to-day are as nearly equivalent to its expenditure as they might be made. I would not be understood as undervaluing past results, but I would urge a more earnest and thoughtful pressing forward in the future, that we may not remain stationary while the world around us moves onward.

JABEZ FISHER.

MIDDLESEX SOUTH.

In the discharge of my duty as delegate of the State Board of Agriculture, I attended the annual exhibition and cattle show of the Middlesex South Society, at Framingham, on Tuesday and Wednesday the 23d and 24th of September. The eleven towns embraced within the limits of this society are of a diversified soil, but as a whole, probably better adapted to grazing than any other pursuit. The farmers, to some extent, are engaged in market gardening and the production of milk, and all the varied pursuits of husbandry are in a prosperous condition. From the returns of the society in 1861, it appears that in that year it paid out $611.70 in premiums, and that the town of Framingham received $311.09. Natick received $66.52, which was the next largest sum received by any town.

The exhibition of the present year was a perfect success. The show of cattle was large, and of superior quality. All the improved breeds were fully represented, and I noticed particularly the improved Short-horns of Mr. White, of South Framingham, the hardy and beautiful Devons of Mr. Buckminster, and the fine Ayrshires of Mr. Peters, of Southborough. One of the animals of Mr. Peters' herd on exhibition was his noted cow Jean Amour, six years old. From his statement it appears that she dropped her last calf May 30th, that for thirty days in June she gave an average of 50 pounds and a fraction per day; for thirty-one days in July she gave 51 pounds and a fraction; for thirty-one days in August 46½ pounds; for twenty-two days in September, 47⅓ pounds per day, making for one hundred and fourteen days an aggregate of 5,612 pounds, or an average of 49 pounds 3 ounces per day, from June 1st to September 22d. Her milk was set for three days in July, and 6 pounds 3 ounces of butter made from it. She weighed on the 22d of September, 976 pounds. This yield is one of the most, if not the most, remarkable of any cow of any breed on record.

Of sheep there was a large show; the animals were of the Cotswold, South Down and Oxford Down breeds. Horses, swine, and poultry were largely represented, and each was the best of its kind. The indoor exhibition of vegetables, roots, flowers, butter, cheese, bread, agricultural implements, and domestic manufactures was particularly fine, and attracted universal attention. The ploughing match was a spirited and successful affair, and brought out finely the skill of ploughmen and teams in this branch of farm labor. The exhibition as a whole, and in all its parts, was, so far as I was able to observe, well calculated to promote the interest of agriculture, and to stimulate the farmers of the society to excellence in the various branches of their calling; and the bounty of the State is dispensed for its legitimate purpose.

LEVI STOCKBRIDGE.

WORCESTER SOUTH-EAST.

Acting in accordance with a vote of the State Board, the undersigned attended the annual exhibition of the Worcester South-East Agricultural Society, at Milford, on the 14th and 15th days of October, 1862.

Arriving late on the afternoon of the 14th, I had only time to look at the fruit, flowers, vegetables and fancy articles, displayed at the Town Hall. Apples were shown in abundance and by a large number of contributors, varying in the number of plates from *one* to *sixty*, which latter were shown by W. Cheney, of Milford. Uriah Bowker, of Hopkinton, presented fifty-two sorts.

The *number* is not named for the purpose of encouraging others to branch out in that direction, such a course not being deemed expedient, except for a few who desire to test the different sorts, in order to ascertain the more profitable for cultivation.

A few varieties, not familiar to the writer, but which appeared well, were inquired after, the merits of which did not entitle them, as could be learned, to especial notice.

Pears and grapes were less plentiful, but good in quality. Some fine specimens of superior varieties of pears from our associate, Mr. Wilder, attracted attention. There were, also, very nice pears and clusters of grapes, which were grown in Milford and vicinity. It is believed to be sufficient to say that the exhibition of fruit compared favorably with others visited by the writer during the season.

The show of vegetables was extensive and varied. Mammoth squashes and cabbages were arranged in proximity to the finer Marrows, Hubbards and Savoys. Monstrous beets and turnips (a few of which may be tolerated on such occasions) were mixed with finer samples. Implements and tools of good workmanship were shown, and among them, a complete fire engine constructed by Charles Shippy, a lad seventeen years of age. I did not witness the machine in operation, but was credibly informed that it worked or rather "played," splendidly, having thrown water over some of the taller edifices in the village. The wood was wrought and the iron forged by the same hands, by piecemeal, at such hours as the young man could be spared from other duties; such hours as others of his age usually spend in idleness, or much less profitable amusement. Thus he labored perseveringly for one year, and I think deserves to have his name conspicuously displayed in letters of *gold*, for his ingenuity and persevering industry.

On one side of the hall was tastefully arranged the fancy and needle work, all going to show that the ladies of Milford and that region are much like ladies elsewhere, experts in getting up fine pictures in worsted, arranging colors in bed-quilts, making lamp-mats, together with a thousand and one other articles which cannot be noticed separately for want of time. Early on the morning of the 15th, in company with Henry Chapin, Esq., our associate here, an hour was spent in looking about the village, and I was both surprised and gratified by the extent and magnitude of the boot manufactories,—the well kept fruit gardens connected with the residences of the enterprising business men in the place. The morning being fine, the people began to gather in from the surrounding hills and valleys.

The farmers of Mendon marched in accompanied with music, and a team consisting of forty yokes of oxen. The major part of the cattle were young and thriving. The writer fell in, or was involuntarily drawn into the current, which was followed a mile or more out of the village to the ground laid out for the ploughing-match. Horse and ox teams, some fifteen in number, the latter preponderating, were got in readiness, when all the teams went once round and stopped, to adjust matters preparatory to a regular trial.

The signal was given, when all started in earnest, and accomplished the job in a workmanlike manner. Some, to be sure, ploughed better than others, as is customary; but there was one feature of this match in which all the teamsters excelled, viz.: there was no extra urging, no "music of the lash," consequently neither bipeds nor quadrupeds perspired, or were fretted in any considerable degree, which was, to me, extremely gratifying.

All now wended their way back to the west side of the village, to the cattle-pens, and to witness the trial of working oxen. In this trial of strength many cattle participated, some of which were young, light and but imperfectly broken to the yoke, surrounded by a multitude of strangers, and other embarrassing circumstances; 'tis not surprising that a few appeared to disadvantage among so many that manifested much patience and docility. Our attention was next turned to the cattle pens. There was observed the fine stock of Jerseys belonging to D. B. Godfrey, of Milford. Joel Chapin, of the same place, had a calf six months old, weighing six hundred and thirty-two pounds, a good appearing animal, except a something, which I know not how to describe, unless it is in this wise: he grew so fast that *precocious greenness* was visible in all his proportions. Also a herd of Devons, thirty-one of them ranging in age from seven months to seventeen years, the property of Harvey Dodge, of Sutton. Beautiful animals they were, showing that their owner knows what stock-breeding means. Another attraction was a fine three-years-old Durham bull, weight eighteen hundred and thirty-five pounds, purchased and then owned by the Milford Farmers' Club, (said club, as I learned, is a live institution, doing its legitimate business by way of making an effort to improve the stock in that locality. Long may it live, say I.) The numerous good points in the animal speak well for the taste and judgment of the owners in making the selection.

D. B. Washburn, of Milford, had a large and beautiful grade Durham cow. The statement in relation to said cow was, that she yielded twenty-nine hundred and sixty-six quarts of milk in four months, the truthfulness of which statement was not doubted; but what seemed remarkable was this: Mr. Washburn acknowledged the cow had had some extra feed, and had not been kept in a barren pasture. A small herd of thoroughbred Short-horns, highly esteemed, was shown by Messrs. Wood, and A. O. Cummings, of Millbury. The display of pigs and porkers was good, and it was observable that the better animals had quite a spattering of Suffolk blood coursing through their veins.

I must mention that there was quite a display of family horses, well trained and fine appearing animals.

Among the feathered tribe a cage of large, snow white Bremen geese showed to advantage. A brood of turkey-hens and large gobblers in another cage attracted attention. There were also high cages containing majestic shanghai and chittagong cocks, in a stooping posture. What a pity it is that those birds cannot be induced to leave off crowing, and be taught to sing in more euphonious tones.

At twelve o'clock the officers of the Society, the chaplain, orator, invited guests, etc., dined, and at one o'clock, entered a church near the town hall, and listened to a very interesting address by Mr. Cutler, who is a teacher and lecturer of considerable note, in the orbit in which he revolves.

Mr. Cutler has spent some time in Europe, is an acute observer, I should judge, a thinking man and well calculated to instruct and edify an audience.

After the address, the secretary of the society, before leaving the church, announced the premiums, together with the names of the successful competitors.

I heard no complaints uttered, saw no one intoxicated, during my sojourn ; witnessed as little which appeared rowdyish as could be expected on such an occasion, and, taking the exhibition all in all, I regard it as a success.

The large number of persons interested in the several departments, the energy and zeal manifested by all, indicate that a large measure of success must crown the efforts of our friends of the Worcester South-East Agricultural Society, so long as those traits are adhered to and petty jealousies kept out.

Asa Clement.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

The forty-fourth exhibition of the Hampshire, Franklin, and Hampden Agricultural Society was held at Northampton on Thursday and Friday, October 2d and 3d, and all things considered, was very satisfactory.

The violent rain of the day preceding, which continued almost uninterruptedly through Thursday, prevented the appearance of many animals entered, and interfered materially with the show of fancy articles and flowers.

The attendance on the first day was very small ; in addition to the officers of the society, the exhibitors and their assistants, few persons were on the grounds ; this no doubt was owing principally to the storm, and from the fact of the second day being devoted to the exhibition of the horse, most persons residing at a distance, and unable to be present on both days, chose the latter.

The grounds belonging to the society are ample, and level; the soil is of that sandy, loamy nature usually found in river bottoms, which absorbs water almost immediately, leaving the ground hard and comparatively dry.

The distance of the exhibition grounds from the town being more than a mile is a serious objection, especially as the roads in that direction are very narrow, and no provision is made for the convenience of foot passengers. (I would suggest that a sidewalk could be made at a slight expense, which would add much to the comfort of pedestrians, and unquestionably prove a good investment for the society.)

A large and attractive building has been recently erected for the convenience of the society. It is two stories in height; the lower one used for the indoor exhibition, while in the upper hall the address was delivered and the collation served; one thousand persons can be comfortably seated in this room, which is admirably adapted to the purposes for which it is intended.

A convenient and roomy building for cattle pens occupies one corner of the lot, while a broad and smooth track, half a mile in length, affords every convenience for the display of horses, leaving an abundance of room for all other purposes.

It was very evident, on entering the grounds, that the show was under the charge of energetic officers. Everything was found in order; punctuality was noticed as the rule, and so strictly were the regulations observed, that at 3 o'clock, with two exceptions, every horned creature came off the grounds, which were deserted for the day.

The entries of live stock and other articles intended for exhibition were so numerous, that had the weather proved fine, the show would have been complete in nearly every department.

The entries of neat stock included two hundred and forty-eight animals, among which were eighty pair of oxen; of sheep, thirty head; of horses, one hundred and thirty-two; swine, nine entries; of fruits and vegetables, eighty-six—some of which included from thirty to fifty-five varieties.

There were but nine entries of butter and cheese, sixteen of bread, sixteen of wines and jellies, eighteen of flowers, and one hundred and thirty-seven of domestic manufactures. There were ten entries in "Progressive Husbandry," which term in this case was to be understood as experiments in raising crops.

About three-fourths of the neat stock entered was on the grounds. The great feature of the exhibition was the show of oxen for all purposes, the larger number intended immediately for the stall. I have no idea that in any other part of New England could a collection be made of such enormous specimens; fourteen pairs owned in Westfield, Hampden County, were very large and handsome, and uncommonly fat for the season. Westfield took all the premiums offered for fat cattle, and for cattle for the stall; two or three pairs of grade Herefords were particularly noticeable for thrift and general symmetry.

The Messrs. Day, of Northampton, exhibited a pair of mammoth oxen, estimated to weigh seven thousand pounds; they were marvels for size and fatness, and were surrounded by an astonished crowd from morning until night.

Elon Sanderson, of Whately, had a very fine pair of four-years-old steers on the grounds.

Luke Bush, of Westfield, had a pair three years old, said to weigh four thousand pounds.

Dr. Prince, of the State Hospital, exhibited a handsomely matched pair of two-years-old steers; also a splendid pair of thoroughly-drilled working oxen, which took the first premium.

Milo J. Smith & Sons, of Northampton, showed their herd of Short-horns, numbering twenty-two head, fourteen of which were thoroughbred, and included some very superior animals.

In cows and heifers the show was quite meagre, only five milch cows being exhibited, none of which took a premium, probably from not having conformed to the rules of the society in furnishing a statement of their product.

Of bulls the best animals exhibited were Short-horns, some of which were of the first order. Asel L. Clark, of South Hadley, and Matthew Smith, of Middlefield, presented the best of this breed in the opinion of the committee.

Of sheep the show was a disappointment, there being but twelve on the grounds, mostly of the middle-wool varieties.

While inspecting the piles of fat exhibited as oxen, some of which are to continue the stuffing process for the winter before being sent to the shambles, one is led to question whether it can be considered good farming for men to keep animals of this character, for the sake of gratifying their pride, when a positive loss must be felt in their pockets; while, at the same time, so much encouragement is afforded for the breeding and feeding of sheep. Would it not be very much to the advantage of the farmers of the hill towns in this section, if they should turn their attention to rearing the larger varieties of coarse and middle-wool sheep? And can the farmers of the valley towns use their hay and grain so profitably as in feeding sheep of the above description? The rapidly augmenting national debt is a guarantee to producers of wool that high duties must be the rule, as they have been the exception in years gone by; wool must necessarily remain at a comparatively high figure, even if cotton should soon be abundant at peace prices. This state of things, taken in connection with the increasing demand for good mutton, which now brings as high a price in our markets as choice beef, must render the raising and fattening of sheep a profitable branch of husbandry. In no other way can the exhausted and brush-covered pastures, seen everywhere throughout the State, be so easily and economically renovated and improved as by feeding sheep upon them; this fact alone should encourage and extend this branch of farming.

The exhibition within the building was varied and interesting; many of the articles exhibited were superior of their kind. The show of fruit, as throughout the State this year, was very fine. Apples and pears were abundant, and unusually large and fair. More attention is being paid to the culture of the pear in this locality than formerly, and the quantity and quality of specimens exhibited was proof that great success is attending the efforts in this direction; judging from the thriftless and neglected appearance of the majority of the apple trees noticed in journeying through this portion of the State, there must be a sad want of appreciation of this most necessary fruit, which will soon make itself seen in a scarcity. One reason for this neglect may be a want of market for apples, but the right kinds will always sell, and generally at a remunerative price. I think if more attention were paid to the cultivation of the

Baldwin and Hubbardston Nonesuch varieties, farmers would find it much for their advantage, and complaints of the want of a market would cease; but few specimens of these kinds were exhibited, and those were not superior. Quantities of fall apples, noticeable principally from their large size, (many of which are thought unworthy of cultivation in the eastern part of the State,) loaded the tables, but comparatively few of our best winter apples were to be seen.

The collection of peaches and grapes was uncommonly large and inviting; many handsome specimens of green-house grapes were noticed.

There was not a large display of vegetables; the mammoth pumpkins and squashes were scarce; the storm unquestionably interfered with this part of the exhibition.

Flowers were in profusion; many beautiful and ingeniously arranged bouquets were interspersed with the fruits on the tables.

In the fine arts and domestic manufactures the display was good, though not so extensive as was expected. The customary collection of counterpanes, embroideries in worsted and silk, with drawings, paintings, &c., was observed.

A number of mowing machines, feed cutters, &c., were noticed, but the exhibition in the department of the mechanic arts was limited.

Of dairy products there were but nine samples, four of cheese and five of butter, which certainly does not speak favorably for the farmers of the hill and pasture towns. There should have been at least twenty-five entries in this department.

I am inclined to think, judging from the character of the cows usually seen in this portion of the State, that too much attention is paid to the procuring of large cows, (which are apt to be coarse, and seldom give milk in proportion to their size or the food they consume,) with a view to raising large steers and oxen. I believe it can be demonstrated that a pound of beef can be made for less money on some of the smaller, thrifty breeds of cattle, than on those of larger frame. The real profit from a cow in this State, however, must be from her milk; and all will agree that there is all the difference between profit and loss in the product of a good cow and a poor one.

The exercises of the first day closed with a most capital address, (a copy of which should be in the possession of every farmer in Massachusetts,) by the Rev. Dr. F. D. Huntington, of Boston. His subject was the "Odds and Ends of Agriculture." The reverend gentleman took a higher view of the position and duties of the farmer than is usual. He called on the working farmers to dignify their calling, which is the most ancient of the arts, the most important and respectable. This most useful essay was heard by not more than one hundred and fifty persons. It is to be hoped that it will be published with the tranactions of the society, and circulated broad-cast throughout this community.

The second day of the show commenced threateningly, but towards noon the clouds dispersed, and the day proving fine, a large collection of persons assembled on the grounds.

There was a fair number of entries in the different classes of horses, and a fine exhibition was made by the cavalcade in passing around the track.

The show of stallions was not as satisfactory as usual, but the carriage, driving, and draught horses were good, the latter unusually so. Some promising colts were noticed, generally remarkable for large size, probably intended for draught purposes. The increased attention which animals of this character are receiving in this vicinity is accounted for by the fact that farmers of the river towns are using horses to a great extent in their farming operations. This can be done to advantage, as the principal fields are in the river bottoms, remote from their buildings which involves much teaming at a distance. The land is well suited to cultivation by horses, as they will accomplish one-half more than oxen under these circumstances.

Some good breeding mares, with colts by their sides, were exhibited. The various trials, for draught, speed, &c., came off punctually, and were witnessed by a crowd of interested spectators.

Dinner was announced at two o'clock, after which the doors were thrown open, when the hall was speedily filled by those who desired to hear the speaking, the great feature of which was an address by the Hon. Charles Sumner, occupying nearly an hour in its delivery, and closing the exhibition.

One objection noticeable in the management of this society, and which is by no means peculiar to this locality, is the custom of showing cattle but one day, in some cases even removing them from the grounds by one o'clock. This practice is prevalent in the western part of the State, and is attended with numerous evils. It has an inevitable tendency to detract from what should be the leading feature of the exhibitions. Commonly, but few visitors are to be found on the grounds the first day, the chief attraction being reserved for the second. Every thing is then given up entirely to the horse. In some instances the whole interest of the exhibition seems to centre in a trial of speed by horses that a farmer would not take and keep as a gift.

I would not disparage the claims of that most noble and useful animal, the horse; and I know of no objection to his showing his paces, whether fast or slow, for the gratification of the multitude. Every one enjoys looking upon a fine horse, either at rest or in motion; and hundreds will be attracted by such a display who would not cross a street to see the best cow, bull, or ox, to be found in the State. My objections are against making the horse the *leading* feature in the exhibition; which practice has wrought a great injury in many of the associations, and will inevitably destroy the usefulness of some, so far as any benefit to the farmer is concerned, unless a change is speedily made.

The question should be, Is the raising of horses a leading business in this State? I think nearly all will unite in saying that it is not.

I know that the prominence given the horse at many of our county shows, and the great fairs held at Springfield, stimulated many persons to the raising of horses. Extravagant prices have been paid for the services of noted stallions; but the object and expectation was to get fast animals, with a hope of large prices. Disappointment has usually been the result; and notwithstanding the high prices which have been current for ordinary animals, for the past two years, caused by the government demand, it is not probable that one-half the number of horses are being raised at the present time that there were four years ago. There are few localities in the State where other descriptions of stock cannot be raised, at a greater profit. Our population is too dense; there is too much demand for every eatable product of the farm; and the price of land is too high, for the business to be followed profitably. We cannot compete with the three States north of us, where land is cheap, hay, in most cases, without a market, and where the finest horses raised in the country can be found at prices which defy competition.

Before closing this report, I wish to call the attention of all interested to the importance of carrying out the leading object that the legislature had in view in giving large bounties for the encouragement of agriculture. I would ask if the various societies, through their officers, endeavor to do all in their power, by the judicious offer of premiums, and in the general management of exhibitions, to help and stimulate the *working* farmer; him who supports his family and educates his children from the profits of the farm? Do not too many of the officers, in the arrangement of premiums, &c., evidently consider, principally, how they can make the show profitable, pecuniarily? This object, I think, has been the inducement to make the horse the leading attraction, in some instances almost ignoring the cattle, and surely tending to disgust the working farmer. It has been the means of establishing new associations that would pay more attention to his interests. This division of societies has had an injurious effect upon the older institutions, decreasing their patronage, and having a tendency to alienate them more and more from the true object of their organization, leading to the encouragement of objects of doubtful utility, until it has become a serious question with many whether the money paid by the State to the societies is a profitable investment for the Commonwealth.

It seems hardly probable that there is a society existing within the limits of the State, which may not be made a useful and profitable institution to the farmers associated with it, and to the whole community; the legitimate object of these associations is not to make money, but to advance the cause of agriculture, and help the farmer in his vocation; by calling his attention to improved breeds of live stock, farming implements, labor-saving machines, fruits, vegetables, &c., and giving him, through practical addresses, the reports of committees and secretaries, valuable information as to the best manner of cultivating his crops, managing his stock, &c., &c.

It is a lamentable fact that in many parts of the State, there is an almost total want of interest felt in relation to the agricultural societies; particularly is this noticeable in towns remote from the place of exhibition: this latter fact has been used as a strong argument in favor of the multiplication of societies, but when we consider the few really choice animals to be found, and the difficulty of getting any large number together, it will be seen that the increase in the number of societies, while it increases expenses, detracts much from the quality, if not from the quantity of stock exhibited; a new society, (which entails a new bounty,) with the great number already existing, cannot but do a positive injury to one locality without a corresponding benefit to the other.

I esteem it the duty of the societies to use all proper means to make these institutions self-sustaining; this can only be done by inducing the farmers to co-operate as a body, and where they do take hold in the matter with a will, the success of the society will be insured; the bounties may be continued for many years, but as nothing is more uncertain than the course of legislation at any time, from a mistaken idea of economy they may be cut off. Our State expenditures are enormously increased by the exigencies of the times, and we may rest assured that every course to reduce them compatible with a due regard for the public interest will be pursued. Let us then in the first place as societies, represented here by the different delegates to this Board, take such measures as will enable us to prosper even though the bounties were withheld, and let our management be such as to unite all parties in the Commonwealth in the feeling that the societies are a benefit to all classes, and that the bounties cannot cease without impairing their usefulness, and causing an injury to the whole community.

In closing my report, I would remark, that the show of the Hampshire, Franklin and Hampden Society was generally well managed, and calculated to encourage improvement in agriculture in this section; the bounty of the State may be said in this instance at least to be well bestowed; improvements could be suggested, some of which have been alluded to. The chief one, relating to the exhibition of neat stock on both days of the show, I esteem a requisite, if the society desires to accomplish the greatest amount of good, and to increase the interest of the working farmer in its prosperity.

To the president, secretary and other officers of the society, and particularly to Mr. Stebbins, of Deerfield, the delegate from the society to this Board, I am indebted for many kind attentions.

HENRY H. PETERS.

HIGHLAND.

The Highland Agricultural Society held its last annual fair on their show grounds in Middlefield, on the 11th and 12th days of September. The situation of their park is on the the highest ground in the town of Middlefield, with a commodious building in the centre for their convenience. This building must have been erected by wise men, "for it is founded upon a rock." This society is rightly named "Highland," for its operations are carried on on the highest of the highlands in that part of the Commonwealth. Every man, woman or child, and the dumb beasts, too, carry their heads higher during the exhibition than they are wont to do on other occasions. This is the fourth and youngest child of the Hampshire, Franklin and Hampden Society, and seems to be the most active and ambitious of the whole.

The competition in the various classes and departments was close, and made it difficult and embarrassing for some of the committees, but all appeared satisfied with the awards. The amount distributed in silver plate figured about six hundred dollars, besides numerous agricultural works. The display of cattle was not as large as at former exhibitions, there being only two hundred and fifty on the ground. They would compare favorably with those exhibited in former years. Many superior animals were shown. Among them, several yokes of four-years-old steers, which were estimated to weigh four thousand pounds and over, per yoke; three-years-old at thirty-eight hundred; and two-years-old at twenty-eight hundred pounds. Among the cattle were many fine representatives of the Short-horn blood, a few of which were thoroughbred, but most of them were bred by crossing with our common stock. This favorite breed has become widely distributed throughout the limits of the society, and produces the most marked improvement, making the farmers, (the skeptical,) to realize that "blood will tell." The best cattle are always the cheapest, and every way the most profitable; and what more grateful sight to the cultivator of the soil, than to see his pastures occupied by sleek, well-conditioned cattle.

There was a fine exhibition of horses. Among them could be seen many, that from their beauty of form, and light and graceful action, denoted the presence of Black Hawk and Morgan blood.

The exhibition of sheep and swine was fair, and in the departments of household manufactures, embroidery and needle-work, were specimens which could hardly be excelled. Indeed, the extent and variety of articles exhibited in these departments, proved that the farmers of the Highland Society, are blessed with wives and daughters who know the advantages of industry, and who devote their time to the laudable pursuit of making their homes pleasant and attractive.

Vegetables, fruits, and flowers were displayed in profusion and variety. I will not particularize, but think if succeeding fairs are as well supplied, the members should be satisfied.

Dr. George B. Loring, of Salem, delivered an able and interesting address, on the relations of agriculture to the nation. It was listened to with marked attention, by an audience that filled the house.

I cannot close without expressing my thanks and gratitude to the officers and members of the society, for their kind and hospitable attention, and particularly to the treasurer, Matthew Smith, whose latch-string is always out, and whose barn-doors on this occasion were thrown open. The result was, his house was filled with guests, and his barn with horses, and all were made welcome and happy.

PAOLI LATHROP.

FRANKLIN.

The exhibition of the Franklin Agricultural Society was held at Greenfield, on the last Thursday and Friday of September. It was conducted with great spirit, and was crowned with unusual success. The grounds, which, last year, were reported to be altogether too circumscribed for the proper accommodation of the society, had been much enlarged, and presented one of the most convenient and admirably arranged parks in the Commonwealth. The officers of the society are entitled to high commendation, for the energy with which they have prepared these accommodations in this season of public depression, and for the taste they have displayed in preparing them for use.

The exhibition was rendered attractive on the first day by an admirable collection of cattle, sheep and swine. The towns of Deerfield, Shelburne, Greenfield and Northfield, furnished their usual quota of those thrifty cattle, which have become so well known as a part of the productions of this portion of the State, and the history of which has been so well written by those who have preceded me, in reporting upon this society. That there should be considerable diversity in the quality of the stock, is not at all remarkable, considering the various modes of breeding and feeding which have been adopted, and the different qualities of the soil which are found within the limits of the society. Still the average is very high, and the strife between the various towns is for the highest excellence, and not for fair mediocrity. Nothing strikes a farmer visiting this section, more forcibly, than the benefit which has already been derived from the attempts to stock the farms well. Well cured hay and well preserved and luxuriant pastures are the characteristics of the neighborhood. No doubt the soil is well adapted to feeding the heavy stock which has been placed upon it; but the wisdom of those who made the introduction is none the less, nor the skill of those who elevated their farming to its wants and have used it to the best purpose. Those farmers, in this section, who are well known for their superior stock, are also well known for their superior farming. And you will be sure to find the choicest cattle where the hay-mow is the most fragrant and the pastures most luxuriant and best cared for;

cattle indicating not only an abundant supply of nutritious food, but also judgment in their selection.

The attention to sheep husbandry seems to be increasing among the members of this society. Much attention has been paid for many years in this county to the winter feeding of sheep for the market, but much care is now displayed with regard to the introduction of valuable breeds. There were on exhibition a few fine-woolled sheep of good quality, some superior grade Cotswolds and Leicesters, and a few Oxford Downs. The contest was chiefly among the coarse-woolled breeds, and the grade Cotswolds appeared to attract the most attention, and to receive that consideration to which their weight of carcass and fleece entitles them. Still it was the declaration of one of the most intelligent farmers at the exhibition, that he could feed fine-woolled sheep with more profit than any others. When the farmers throughout this Commonwealth have learned that wool is worth more than mutton to the producer, and that quality and shape of carcass are worth more than size, they will have arrived at the rudiments of that system of sheep husbandry which has enriched all who have engaged in it, and which is the only branch of that husbandry which is now, or has ever been profitable in Massachusetts.

The swine on exhibition had a large admixture of Chester County blood, and resembled in shape and size the large Yorkshire pig of Great Britain.

The exhibition in the hall was very interesting. A large and handsome collection of fruit, and many specimens of handiwork were extremely well arranged and attractive. The grain crops were well represented. More competition in root crops would have been gratifying.

The second day was devoted to a large exhibition of horses, and to the inauguration of the new fair grounds, by speeches from Hon. A. H. Bullock and others. The address of Mr. Bullock was an unusually eloquent discourse upon the opportunities and possibilities of the Massachusetts farmer, and it was listened to by a numerous audience with extreme delight.

Your delegate cannot commend too highly the energy and activity of this prosperous and well conducted society.

Geo. B. Loring.

HAMPDEN EAST AGRICULTURAL SOCIETY.

The annual exhibition of this society was held at Palmer, on the 14th and 15th of October, at the Trotting Park, near the village. The attendance was highly respectable ; and the arrangement of the show on both days indicated a determination, on the part of the officers of the society, to place their association upon a firm foundation, and to make it, in enterprise and usefulness. second to none in Massachusetts.

On the first day the show of cattle, sheep, and swine, was large and interesting. There were few grade Short-horns, but what were exhibited were large and in fine condition. The predominant feature of the collection of cattle was the large number of animals indicating strong Devon blood. A herd belonging to D. B. Merrick, of Wilbraham, contained some remarkably fine animals. The bull "Kossuth" has great merit; and we have seldom seen so large a number of this breed in one herd maintaining so high an order of excellence.

The quality of the cows exhibited indicated great care and skill in selection and breeding. It is evident that the farmers of this society understand the value of the dairy, and have made great efforts to improve their stock for this purpose. The presence of many bulls, having Ayrshire, Devon, Hereford, and Short-horn blood, indicated the attention and zeal with which this branch of farming is pursued. If the object in feeding the pastures of this section is the production of beef, the compact form and superior condition of the Devons presented a strong argument in their favor. But it would have been gratifying to have seen a large and uniform collection of medium sized dairy cows, bearing the marks of some hardy dairy breed. There is much fine grazing land in this region, admirably adapted to such animals.

Of sheep the show was extremely creditable. Prominent among them was an Oxfordshire buck, belonging to A. N. Merrick, of Brimfield. This animal possesses many attractions to those who would breed mutton sheep. The remaining animals were a mixture of the several varieties of coarse-woolled sheep, and they presented the usual appearance seen throughout most of New England.

The exhibition of swine and poultry was large and fine.

It is seldom that a better collection of working oxen is seen. The size of most of them was that best adapted to New England farms; and their training was excellent. In the handling of a load, and at the ploughing-match, their good education was very apparent.

The ploughing was performed on the Park. The soil was light, and the work was done with good dispatch; but the furrows were rather shallow, and, in most instances, were not laid flat enough to form an even surface for cultivation. Shallow ploughing for a short life, and deep ploughing for a long one, may be a farmer's rule on this subject.

The second day was occupied with the show of horses, the address, and trials of speed. The collection of horses was not large, but was marked by some very fine specimens. The driving horses, single and double, were excellent. The colts were, many of them, descended from the various families of Morgans, and possessed the compact, muscular form, and easy action of this breed.

The entries of animals were as follows: Bulls, 9; cows, 15; working oxen, 23 pairs; fat cattle, 8; heifers, 21; calves, 8; sheep, 10; swine, 9; poultry, 16; stallions, 4; pairs, 2; driving horses, 5; mares and colts, 8.

In the hall, the exhibition of vegetable and root crops was well worthy of observation, and indicated a laudable attention to this branch of farming. Some fine specimens of Swedes showed that the land of this section is admirably adapted to this crop. The varieties of fruit were numerous, and the specimens of the various branches of domestic economy were indicative of industry and skill.

This society seems to be in a prosperous condition. It is managed with economy and skill; and occupying, as it does, one of the best farming sections of Massachusetts, it will undoubtedly do much to stimulate agriculture, and to diffuse that knowledge which always comes with emulation and careful observation.

Geo. B. Loring.

BERKSHIRE.

The undersigned appointed as delegate to the Berkshire Agricultural Society, was prevented by ill-health from performing the duty which otherwise would have been most agreeable to him. In obedience, however, to the requisitions of the Board, he has procured the following facts from a competent judge who was present during the whole exhibition :—

" The cattle show of the Berkshire Society was accompanied by a storm so violent as to confine the attendance of spectators on the first day—that for the exhibition of stock—almost entirely to those personally interested in the animals, and the officers and committees of the society. It was a remarkable fact, however, that notwithstanding this, the show was unusually fine in some, or most departments, and about the same in numbers as in average years.

" In cattle the Durham and crosses of that, predominated as usual, and the appearance of the stock on the ground fully justified the partiality of the Berkshire farmers for this breed, and showed a continued progress in the advance to perfection to which they are bringing it.

" There was, however, this year an increase in the number as well as the character of the Devons, some fine bulls of that stock having been recently introduced.

" There was a fair show of sheep, the coarse-woolled predominating, among which we noticed some superb specimens of the favorite Cotswold. The state of the weather and the track detracted more from the exhibition of horses than from any other department, but the handsome show of farm horses, breeding animals and young horses, showed that the attention bestowed by this society upon this department, had been attended with excellent results in classes of this noble animal, more valuable, at least to the farmer, than 'fancy bloods.'

" On the whole, the cattle show, considering the many unfavorable circumstances under which it was held, was a remarkable success, and proved conclusively the practical and substantial interest which the farmers of Berkshire take in its objects.

" In the hall the exhibition, although smaller in numbers than in some years, was varied and large considering the unfavorable circumstances which it shared with the cattle show. Butter and cheese, for which this show is famed, were exhibited in quantity, and of a quality fully to sustain the long established reputation of the county. The arrangements of the society this year for the exhibition of these articles, as well as fruit and some others, were much improved. Of fruit there was an exceedingly large and fine exhibition, due in part to the favorable season, but in no small degree to the increased interest imparted to fruit culture within a few years past. Grapes have assumed the place of peaches as a delicate fruit, but more able to bear the rigors of a mountain climate. Wines from native grapes, currant and other berries, begin to form an interesting department in the exhibition, and are of delicious flavor. As a general thing the exhibition of vegetables and seeds was not large or of superior quality. There were, however, some notable exceptions. One exhibition, that of Mr. A. W. Bigelow of Lenox, deserves special record, as showing the value of the seed distributed by the patent office. At the fair Mr. Bigelow presented no less than one hundred and twenty-five varieties of vegetables exclusive of fifty-seven varieties of beans. Most of these were raised from seed furnished by government, and which he gave a fair trial, although his garden is only an adjunct to his farm, some of the specimens are only ornamental; many are not superior to old varieties, but some appear to be valuable additions to our variety of garden vegetables. At any rate Mr. Bigelow's exhibition goes to show what may be learned by a faithful trial of the seeds, as an experiment, the only object of their distribution.

"The department of manufactures and the fine arts, which from its foundation this society has sought to encourage, this year showed more than ever, at least since the early years of its existence, the effect of that encouragement in articles which are now famous all over the country.

"The cattle show of the Berkshire Agricultural Society this year then, although far from a pecuniary success, and although it was not a source of great personal pleasure to those who took part in it, was one in which the members might take great pride and pleasure as showing how much more than amusement is involved in its annual festival."

MARSHALL P. WILDER.

HOUSATONIC.

The twenty-first annual exhibition of the Housatonic Agricultural Society was held at Great Barrington, on the 25th, 26th and 27th days of September last.

Having been prevented, by circumstances beyond my control, from attending it, I have collected, from the public journals, such facts as will serve to represent the character of the exhibition, and the condition of the society. But, though I may in this way partially accomplish the object of my appointment as your delegate on the occasion, it will yet be a cause of deep regret that I could not otherwise discharge the duty incumbent on me, nor enjoy the pleasure I anticipated in performing it.

The exhibition appears to have exceeded the general expectation in several respects. It yielded large returns to the society. It contributed much to the enjoyment and to the benefit of the people; and it afforded good evidence of the intelligence, industry and thrift of the yeomanry and mechanics, and of the housewives and daughters of southern Berkshire. At its commencement, apprehensions of its success were felt, in consequence of indications of an approaching storm;—of the absence of a large portion of the citizens now in the army, and of the heavy, pecuniary pressure of the times. The number of visitors on the first day was unusually small. But, on the second and third days, the attendance and interest were all that could be desired. Farmers exhibited praiseworthy ambition to excel in displaying the products of their fields, gardens and orchards, their stalls and styes; while their wives and daughters vied with one another in exhibiting proofs of their skill in floral culture, and various specimens of the useful and ornamental domestic arts.

Of neat stock, it was reported by the examining committees of several divisions, that there was apparently a considerable falling off from the displays of former years, in the number and quality of the animals on exhibition. This deficiency, however, was, in some instances, supplied by the superior excellence of the animals. On the whole, we infer that, in regard to this department, the reputation of this part of Berkshire was less fully sustained than it might easily have been under other circumstances than those which now affect the whole community with a depressing influence.

Of sheep, the number on exhibition was unusually large, particularly of the coarse-wool grades, and an increased and highly gratifying improvement in this class of stock was apparent.

Swine, not in large numbers, though of large proportions individually; and poultry, of different classes, though without much competition, claimed and received the appropriate premiums.

Of horses, for the farm, there were present a large number, of all the various classes for which premiums were offered, fully sustaining, on this point, the reputation of the society. Of mares and colts, it is said, the display could not be easily surpassed in any other part of the Commonwealth.

In the ploughing-match, by ox-teams, there was little competition, much less than would naturally be expected here. Of horse-teams there were nine entries for the contest. The work was well done, and very creditable to the ploughmen.

Of summer crops, wheat, rye, oats and barley, of which specimens were exhibited, the harvest in southern Berkshire was plentiful and excellent; of wheat and oats, seldom equalled, and almost never surpassed. One hundred and nineteen crops were submitted to the examination of the committee, exciting their admiration, and a grateful recognition of the beneficence of the great Ruler of the seasons.

Of fall crops, the committee reported that they examined ninety-five, in twelve different towns; that, in consequence of the backwardness of the season, and an unusual quantity of rain, the crops were late in maturing, and could not be estimated by the usual test of weight and measure. Of corn and buckwheat the crops were, in general, light. Of roots there was, of all sorts, an average in quantity and quality. But of potatoes —the most valuable of all—the crop equalled the old times, and now, to many ears almost fabulous quantity of four and five hundred bushels to the acre. This fact is of great interest to the whole agricultural community. It suggests at once the inquiry whether it is attributable to any peculiarity of seed or of cultivation, or to the favorable character of the season;— whether it be simply an incident in the good fortune of the cultivators, or the natural result of superior skill in husbandry. We cannot but draw a significant conclusion in the case when we read of such productions as are here reported,—of four and five hundred bushels of potatoes to the acre,—carrying our thoughts back to ancient days and winter-evening feasts around the home fireside;—and of cabbages which would fill a two-bushel basket, offering to the Dutchman the grateful prospect of a sufficiency of sour-crout for him, at least, for a twelvemonth. Our curiosity also is quickened, if our credulity be not staggered, when we are told that such crops are here grown by manure collected without the cost and care of keeping a large stock of cattle; and see that, in proof of this fact, the method pursued by the farmer, to whom was awarded the first premium for a crop of corn from four acres, is referred to with confidence. Certainly such a crop could not have been grown without a sufficiency of fertilizing matter of the proper sort We thank the committee for the suggestion, which cannot be too often repeated, nor too widely disseminated, that "the most grievous error of our farmers is the waste of manure," and that, "with equal care, almost any one may"—in proportion to his means—"equal" the possession of "him who counts his fertilizers by the hundred loads." Perhaps the valuable essay on "the wastes of the farm," by a retiring and much esteemed member of this Board, may have brought this subject more forcibly to the minds of the committee. We have had occasion to know that it has produced a similar effect in other cases, and we cannot but hope that its lessons of instruction and admonition will be heeded in every agricultural community.

The farmers of southern Berkshire are not inattentive to the importance and value of reclaimed lands. Several large tracts of such land, already reclaimed or in process of reclamation, had been so altered and improved, during the year, as to entitle their owners to the premiums offered by the society. Among them, we observe with pleasure, that one was awarded—for the greatest improvement of three acres—to the gentleman who represents the society at this Board.

We fully accord with the committee in their recommendation of a top-dressing of loam, sand, or fine gravel upon reclaimed swamps, and in their suggestion that some added material is necessary, at short intervals, "to keep these lands in a good state of productiveness, and in the finer qualities of grass."

In fruits and flowers southern Berkshire appears to have shared most bountifully, in common with other parts of the Commonwealth; and the exhibition was graced with magnificent fruits and beautiful flowers, of various sorts and in great profusion. Bread and honey, butter and maple sugar, all tempting the taste and puzzling the good sense of the examiners, had each their deserved commendation and their appropriate premiums.

Of household manufactures and the useful and ornamental arts there were specimens worthy of the reputation of their fair contributors, and deserving the premiums they received,—conclusively proving, in very nearly the language of the committee, "that, while war, with all its bloody horrors, is upon us, and abundant cause might be found for neglecting or forgetting those elegant arts and accomplishments which contribute so much to the higher and purer pleasures of life, there have been some who have not forgotten them; that while busy fingers have not lost their skill in the performance of household duties, or in providing nameless articles of necessity or of comfort for the soldier in the tented field or in the hospital, some have found time also to cultivate their own taste and skill, and to convey pure gratification to others, by the creations of the pencil and the needle."

The last, and perhaps most attractive part of this exhibition, was the display and trial of horses upon "the turf." This was attended by a large concourse of spectators, and afforded general satisfaction. Several of the premiums appear to have been open to competitors from any quarter, and were awarded to competitors from New York, Connecticut and Rhode Island. Some of these premiums far exceeded in value even the highest offered in any other department of the exhibition. And we are led to believe that here, as elsewhere, the attractions of a display of horses, and the trial of their speed and quality on the turf, are overriding the more strictly legitimate objects of a cattle show. We shall not attempt to argue the utility and propriety of devoting so much time and money to the exhibition and trial, in this way, of that noble animal—the horse. Nor do we intend to intimate a belief that such a course is inconsistent with generally received notions of propriety, and of the real purpose of an agricultural exhibition. We allude to the fact, or rather our apprehensions of the fact, as one that, whether it be right or wrong, is materially affecting the character, the attendance and the receipts of most of our agricultural societies; and because, in the present case, it furnishes a sufficient reason for the large receipts of the society, exceeding, we are told, the sum of eighteen hundred dollars.

The address on this occasion was delivered by Professor Bascom, of Williams College. The subject of it was "Neatness in Farming, and its advantages." It was an address admirably fitted for the occasion; replete with profitable suggestions, and sound, practical instructions, clothed in plain, yet interesting and scholarly diction.

CHAS. C. SEWALL.

NORFOLK.

Pursuant to my appointment as delegate from the State Board, I attended the show of the Norfolk Agricultural Society, which was held in Dedham, on Thursday and Friday, the 25th and 26th of September; not being present the first day of the fair I was unable to witness the ploughing-match and the exhibition of horses, but from reliable information the ploughing-match was fully equal to former years. The number of horses was less than usual on account of the great number taken to the war, yet the show was very good. Arriving on the ground the morning of the second day, I found a large assembly of persons all seeming to be in the happiest mood possible. After meeting with a most cordial reception from the president and other friends, I witnessed the exciting spading-match, which was exceedingly well done, leaving the ground in good condition to receive the seed.

The show of stock was not large, consisting mostly of thoroughbred animals; there was one herd of Kerry cattle, a very small breed but of fine proportions; one herd of Jerseys; a few of the Jamestown stock; also a good number of grade cows of superior excellence.

The show of swine, though not large, was very fair; quite a number of fine porkers were exhibited. The cackling tribe was well represented. The display of flowers was very large, next to the fruit was one of the attractions of the hall. Of fruits there was an excellent display, such as would have done honor to a Pomological Society, and fully warrants the high reputation of Norfolk County for her fine fruit. Col. Wilder exhibited one hundred and twenty-five varieties of pears; many other gentlemen made large contributions of apples, pears and peaches. Grapes were largely represented both native and foreign.

The department of vegetables was very much like what is commonly shown on such occasions. The display of ladies' work was very creditable to the fair sex, though not so large as usual, their time no doubt being occupied in preparing comforts for their friends in the army.

At twelve o'clock a procession was formed on the grounds of the society, preceded by Gilmore's full band, marched to the upper hall, where a sumptuous dinner was in waiting. At the conclusion of the dinner, Col. Wilder, the president, made a brief speech, after which he introduced Hon. B. F. Thomas who in a brief address eloquently discoursed upon the blessings that surround the farmer and his calling in life. Francis P. Denny, Esq., followed with an excellent poem upon the True Farmer. Brief addresses were made by several persons present, when the exercises of the day closed to the entire satisfaction of all present. The success of the exhibition shows conclusively the deep interest the society has in the improvement of agriculture, and in the progress and prosperity of the community.

HENRY CHAPIN.

PLYMOUTH.

The exhibition of the Plymouth Agricultural Society was held at Bridgewater October 2d and 3d.

The first day being very rainy, few were in attendance beyond the officers of the society, the committees and exhibitors.

The second day opened auspiciously, and at an early hour the people from various parts of the county were gathering to the exhibition ground.

The society owns an enclosed park of about forty acres, upon which the entire exhibition is held, including the ploughing-match.

A commodious building, two stories in height, is centrally located upon an elevated plat overlooking the entire park. The lower hall is devoted to the display of fruits, vegetables, fancy and domestic articles. The upper one is used as a dining hall; and at the close of the exhibition more than four hundred ladies and gentlemen were here seated to partake of a bountiful collation, and spend an hour in mutual interchange of thought and sentiment.

Being present only on the second day, I was unable to obtain names, and particulars of entry to any great extent.

The large hall was well filled with the choicest productions of the farm, the fireside, and the workshop.

The show of animals was not large. Of sheep, I noticed Leicesters, and grade South Downs, which were very good. Some of the carriage horses possessed superior merit. A class of horses raised in the county was, perhaps, the most marked feature in this part of the exhibition.

Of neat stock, the Alderney was the only pure breed represented, and that by a few good animals. Aside from these, most of the stock present showed little indication of the presence of improved blood.

One of the practices of this society appears to me not calculated to promote improvement in stock growing; and it is worthy of serious consideration whether societies receiving the State bounty should be allowed to offer premiums for grade and mongrel bulls. Yet this society does offer its highest premium for bulls of this sort. A glaring example of the inconsistency of this course was made public, as the premium animals were led upon the track in front of the judges' stand to receive their awards. The only thoroughbred bull upon the grounds, and he a very fine specimen of Alderney, was awarded six dollars; while a grade bull, every way inferior to the former, was awarded ten dollars. And this is not the fault of the awarding committee. This premium is offered for a bull of any other than pure blood.

The practice of so many of our agricultural societies resembles so nearly that of the Plymouth, that I trust these remarks will not be thought to bear too severely upon that society, but as applicable to all which offer premiums for this kind of bulls.

I believe it is the acknowledged conviction of every individual who has given due thought to this subject, that the true, economical, and permanent improvement of our neat stock is to be effected by crossing the best bred sires of some one or other of the improved breeds upon the best females of our present stock, the female offspring to be again crossed in like manner, while the males, without exception, are either castrated or slaughtered while young.

Let this course of breeding be firmly pursued during a series of years, and we shall have a stock possessing and exhibiting the marked characteristics of the breed from which we have chosen our males, and which can be obtained in no other way except by resort to pure bred animals of both sire and dam.

I could name a farmer in the highlands of western Massachusetts, whose entire herd of more than twenty animals are descendants of one ordinary, pale red, long-horn cow, not as desirable as can be found at the present time in almost any farmyard. Yet this herd is remarkably uniform, and possesses characteristics of the pure bred Short-horn.

How has this change been wrought? I answer, simply by the continued use of thoroughbred bulls of this breed for more than twenty years, and by careful weeding. That is, by retaining as breeders such heifers only as approached most nearly to his ideal standard. To such a degree of perfection is this herd brought at the present time, that there is seldom occasion to apply the weeding process.

One of the greatest hindrances to permanent improvement is found in the use of these impure worthless bulls. Many who make one cross, go no further. If the produce of this first cross be a male, it is quite likely to be kept as a sire, and in the amount of patronage bestowed becomes a successful rival of his pure bred sire. He possesses in equal proportion the blood of sire and dam; but in appearance resembles more nearly the former, and for any other purpose than that of breeding is valuable. How is it with his offspring? Are they superior, or even equal to the sire? By no means, but generally inferior; and this should be expected. In them, the impure blood is largely in the ascendency, and with each successive cross of this kind becomes more apparent, until the improvement, so marked at first, is lost sight of, and we arrive at the bottom of the scale.

This is what our agricultural societies are encouraging by the offer of this class of premiums. They are saying practically that improvement in stock growing should be abandoned, and more than this, they encourage a retrograde movement.

I am happy to know that some of our societies have abandoned this pernicious practice, and ardently wish it were trueof all.

I am aware that with very many of our farmers such a change is looked upon with disfavor and suspicion ; but this does not detract from its importance, or render less imperative the duty.

I am fully persuaded that any opposition, or unwillingness to co-operate in this measure, arises from indifference and want of thought, rather than from any well settled convictions. These agricultural organizations should be examples, and to some extent, leaders and creators of public sentiment, in matters within its appropriate sphere.

If it be true that the policy here advocated is calculated to promote the best interests of this important branch of industry, then it should be at once adopted. And when the united testimony and influence of these organizations is thus given in favor of this measure, then we shall witness, as the legitimate and inevitable result, a steady though it may be gradual improvement in all the desirable qualities of our neat stock. And this not in isolated cases but pervading the mass ; enriching and benefiting not the farmer alone, but the community.

My acknowledgments are due especially to the president of the society, Charles G. Davis, Esq., for his kind attentions during the exhibition, and for an invitation, which I readily accepted to visit him, and examine hastily his farming operations upon the soil first occupied by the Pilgrims.

P. STEDMAN.

BARNSTABLE.

According to the reports of former delegates, the exhibitions of this society have been conducted with a good deal of display, which, if not strictly agricultural, served the excellent purpose of making a pleasant holiday, drawing out crowds of people, who were amused, delighted and instructed. And this way, according to my idea, is right. We shall never be likely to have too many holidays; the sons of the Pilgrims will never be ruined by a superabundance of them. We have too much of the old Puritan abhorrence of saints and feast days, ever to suffer them to encroach on our working days. We have five holidays made by statute; and our legislature, whatever else it may have done worthy of notice, made itself memorable by putting upon record that "Fourth of July, Thanksgiving, Christmas, Washington's Birthday, and Fast Day," are no longer days of business, but of pleasure, on which the people are not obliged to labor, but may enjoy themselves. But "Cattle Show Day" is the farmer's truly voluntary holiday. On that day he should, and I am happy to say he does, usually stop work, and with his wife and children enjoy a day of relaxation from toil, and of social intercourse with his neighbors and friends. On this occasion, however, owing to various unfavorable circumstances, the officers wisely determined to omit, for this year, the military parade, the band, and the public dinner, and to depend upon the attractiveness of a purely agricultural exhibition; and the result has been a most successful show, creditable alike to the officers who made that decision, and to the people of the county, who, in full numbers, showed their appreciation of the occasion, and an unabated interest in the anniversary. It was very gratifying to witness so much enthusiasm on the subject in this county, naturally unfertile, and unfavorable to a high development of agricultural operations, when compared with more western counties.

Tuesday, the first day of the exhibition, was gloomy and disagreeable, darkened with clouds and made uncomfortable by the wind. The people, however, came in good numbers, and the display of stock was very creditable. Some excellent cows and heifers, fair steers, and good colts, were shown. I was sorry not to see more sheep in the pens. Barnstable County, with 45,736 acres of unimproved land, ought to keep more than 1,460 sheep; not one-quarter part of what she had twenty years ago. Of the poultry, the ducks and geese were uncommonly good. In the afternoon was a ploughing-match, on a pretty unpromising piece of land. One notable bit of work was done by a beautiful pair of Devon steers with a "cylinder plough," made by Smith & Field, of Greenfield, held by "Good Speed"—a name suggestive of the motto, "Speed the Plough."

The second day was bright and beautiful, and there was a fine display of men, women and children. The display of manufactured articles in the hall was quite large; of fruits, very fine; of vegetables, not so good as it should have been. I was surprised that in a locality so suitable to the cranberry, and where the crop is so abundant, there were but two samples of this fruit exhibited. I had expected to see a fine display of the different varieties of it. Butter and cheese looked well. Some of the bread was excellent, and some of it, with some gingerbread and cake, had a look fearfully suggestive of painful experience to the consumer of them. However, the "bane and the antidote" were, as is often the case, found in close juxtaposition; for next this mass of indigestibility stood a *half peck* of Epsom Salts—equally suggestive of like painful experience.

At ten o'clock the society held its annual meeting, in the upper hall of the large building, chose new officers, and transacted its regular business. I may be allowed to say, that I do not like the plan of this, and some other societies, of holding the annual meeting during the show; it takes away, for some hours, the active business men of the society, who are needed, and who wish to be, elsewhere, witnessing or participating in the various departments of the exhibition. It does not give time for the proper and thorough transaction of their business. Men hurry through it, anxious to get away to the show, and to join their families and friends. Many, too, have valuable stock to look after, or are on important and perhaps perplexed committees, and cannot attend at all. A full half day is little enough time for any society to discuss and understand its affairs, and finish up the year's work and start anew. I prefer holding the annual meeting in January, not only because it allows more time, but also because it brings the farmers together. Every such meeting of men engaged in a common interest, and bound by the tie of a similar business, leading them to become better acquainted with each other, promoting talk and discussion on topics pertaining to their common occupation, must be improving to them.

Then, again, the fiscal year of our agricultural societies closes on the 10th of December, at which time we render our accounts and reports to the Secretary of the Board of Agriculture, and it seems to me desirable that one set of officers should finish up the year's business, uninfluenced by the prospect of a new selection.

The principal reason for holding the meeting at the time of the show, as I understand it, is that of having members together but once, and avoiding another meeting. I should regret to think that in any county, a lack of interest would forbid an annual meeting in the winter.

In the afternoon, appropriate services were performed in the upper hall, consisting of a prayer; dedicatory address, by Hon. George Marston, the president; music, &c. The whole affair passed off pleasantly, and with the most perfect decorum on the grounds and in the town, so far as I observed.

The county of Barnstable is now undoubtedly improving in its agriculture, although it is at this time far behind its agricultural position in 1840—twenty-two years ago.

Doubtless whatever diminution of material wealth in the county there may have been, it has been supplied by other branches of industrial occupation; but I should think that when the farmers of Barnstable consider what their county has produced, and is capable of producing, they would feel a renewed encouragement to advance their agriculture.

The society is in a prosperous condition, and its members deserve the highest credit for their energy and perseverance.

James S. Grennell.

NANTUCKET.

My attendance at this fair was made the more interesting to myself from the fact that I resided in Berkshire County, the most distant county in the State from Nantucket. The face of the country, the climate, and some of the agricultural productions of the counties of Berkshire and Nantucket are quite different from each other. I was somewhat surprised and highly gratified to find that the capabilities of the island of Nantucket are so considerable as they are for agricultural purposes. While the citizens there have, to some extent, availed themselves of these capabilities, it is clear that they have very great resources yet unimproved. With faithful cultivation, the soil throughout most of the island may be made productive, and may well support a population larger than at present. The attention of the people having heretofore been directed to other and more profitable pursuits, it is not surprising that they have drawn their supplies of agricultural productions from other localities. But with them this has been a matter of choice and not necessity. The resources of the island for manure from the sea-weed cast upon its shores are very great. Much of the land is arable and of easy cultivation. If the lands were inclosed, cultivated and manured with the energy and industry which the people have always shown in other pursuits, the island would, in a few years, present the appearance of a garden.

The show of the present year was a good one, though the time of the exhibition had been changed, and the change was not generally known. There had also been an unusual drought during the season. But the cheerful, industrious character of the citizens, and the officers and members of the society, rendered these disadvantages of little consequence. I saw enough to convince me that the island of Nantucket is at no distant time to be, in proportion to its extent, one of the most productive agricultural counties in the Commonwealth. When the forests already planted shall have attained their growth, and larger tracts at intervals brought into forest, the effect of the sweeping winds over so level a country, upon standing crops, will be diminished; the forests themselves will be a source of income; and the other parts of the island enclosed and cultivated, will pay well. The island will then have a variety of resources, greater than most of our counties. The show of cattle was very good, particularly of milch cows; the number of working oxen was small, and not remarkably good. The exhibition of sheep, swine and poultry was very good; that of horses was quite inferior. The show of vegetables was not as large as I have sometimes seen, but the *best* I ever saw, and shows what the island of Nantucket can do in the way of vegetables. The exhibition of butter was very fine, as good as I have ever seen, although the number of entries was small; but the samples were hard to beat. I also saw some splendid samples of wheat and corn, demonstrating beyond any doubt that these crops can be grown on the island by good cultivation and perseverance.

The exhibition at the hall in the evening, under the supervision of the ladies, was, as might be expected, a *decided success.* The decorations of the hall were in good taste, and the specimens of needlework, both useful and ornamental, creditable to the skill and industry of the exhibitors.

In addition there was a display of rare flowers and fruits, among the latter, some choice grapes, showing that the island can be made productive to any extent by patient culture. The exercises of the evening were enlivened by music of *domestic manufacture*, which added to the interest of a festival in which the whole community contributed their quota. Your delegate was under great obligations to James Thompson, Esq., the worthy President of the Nantucket Society, for his politeness and attention during my visit. All of which is respectfully submitted. H. Colt.

MARTHA'S VINEYARD.

The fifth annual exhibition of the Martha's Vineyard Agricultural Society took place October 21st and 22d.

The society has a fine level piece of land of about two acres for its show grounds, and a commodious hall on the same for the exhibition of articles usually shown in such places.

The show of neat stock was poor in quality and few in numbers, consisting of about forty-five head, of all ages and sizes. There was not, in my estimation, a really valuable animal of this class on the ground though I may have been too fastidious in the matter. However, I will venture the assertion that we have many single farmers in the State whose yards would make a far better show than did Dukes County on the 21st of October.

I will in justice say, however, that I was told by some of the officers of the society that they had better cattle on the island than were shown. The reason given for not bringing them out was the feelings of the community on account of the troubles in our country, and the great interest manifested in putting down the rebellion, and this undoubtedly had that effect as I know it did in other places.

But I must say that I think it is very important in the present state of our country that we do not let our agricultural zeal flag; and also that members of a society should always sacrifice something to have their stock on the ground and to help the show in all reasonable ways.

Of sheep there were but few on the ground, some eight or ten all told, of no particular breed or value. I suppose they must be a fair sample of the sheep on the island as I visited what was said to be one of the best flocks ; in fact I learned from a man I accidentally came across on board the boat on my way home who buys most of their wool, that it averaged a little less than two and a half pounds to the sheep, and this in a county eminently adapted to the raising of sheep especially the more wool-growing varieties. I do not remember to have seen better sheep pastures than they have in Chilmark. In this I know I do not agree with a former member of this Board from this society who, in his report last year, said that "flocks from abroad highly fed do not prosper on the lean pastures of the Vineyard," and I found the general impression among the farmers was that well bred, valuable sheep would not stand their climate. Of one thing I am certain no respectable sheep would stand such treatment as they give theirs. They are rarely sheltered except what they get from the lee of a barn, rock, or wall, and foddered but little.

The fact is, the mildness of their climate is a curse to them, (the sheep and farmers both,) as they seldom have snow that lasts more than one or two days. The consequence is, they let them graze the most of the winter, and one man told me he had sheep he had never foddered. I think no good sheep breeder would expect many, if any, of his sheep to live through the winter with such treatment, even if we should have no snow. I had much rather my sheep would lie out in a snow than rain storm in cold weather. If the climate was such that they were obliged to house and feed them, I doubt not it would pay the extra expense and a good profit. Perhaps, also, if the farmers of the Vineyard had fewer sources of wealth, and were obliged to depend more upon their farms for support, they would farm more carefully and make it much more profitable.

The horses on exhibition were very few. They appeared, however, to be very serviceable animals, but not very strong.

Of swine there were but few entries, but were of fair quality.

The show in the hall comprised about the usual variety of articles in such places, which were of good quality, but few in numbers. The corn, in particular, appeared firm and heavy. There were, also, some excellent specimens of wheat.

Fruits were not numerous, but of fair quality, and showed some effort in that direction, especially as the sea breezes, I am told, are unfavorable to their growth.

The farmers have paid more attention to the improvement of their soil and crops than their stock, but they do not employ much machinery in its cultivation, though the surface and soil are peculiarly adapted to its use.

They had no regular address on the occasion, but met in the upper room of the hall the afternoon of the second day, and spent a very pleasant time in hearing interesting remarks from their president upon agricultural matters generally, also statistics of the society and of the extent and resources of the island, and short speeches from some of the members, in which were shown a desire for improvement, and I hope soon they will put it in practice to a greater extent than they yet have done.

As the delegate of the Board, I was cordially received and treated with great kindness by the officers of the society, especially the president, Henry L. Whiting, to whom I am much indebted for his kind hospitality and for a drive over various parts of the island. I shall always remember my trip to the island, and the time spent there, as being some of the pleasantest spent for a long time. My report may seem like finding too much fault, but my only object is the good of the society, and to make my long journey there of use to the farmers, that the State may be the gainer, and not the loser, by her liberality.

To the credit of the people be it said that I did not see a case of intoxication or unbecoming behavior in all the crowd. Every thing was conducted in the most quiet and orderly manner.

MATTHEW SMITH.

ERRATA.

Page 35, 10th line, for "236" read—336.
101, 6th line, for "Crop Fertilization" read—Cross Fertilization.
220, 5th line, for "jems" read—gems.
248, 9th line, for "Vó*n*geot" read—Vó*u*geot.
251, 27th line, for "Cecella" read—Cæcilia.
337, 14th line, for "Prater" read—City Park.

APPENDIX.

RETURNS OF AGRICULTURAL SOCIETIES FOR 1862.

FINANCES.

SOCIETIES.	Amount received from the Commonwealth.	Income of the permanent fund.	New members and donations.	All other sources.	Receipts for the year.	Premiums offered.	Premiums and gratuities paid.	Current expenses —not including premiums and gratuities — for the year.	Disbursements for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund.
Massachusetts, . .	-	$1,862 00	-	$504 18	$2,366 18	$1,825 00	-	-	-	-	-	$41,239 41	$41,239 41
Essex, ...	$600 00	424 20	$93 00	893 69	2,010 89	1,547 00	$776 00	$917 18	$1,693 18	-	$6,000 00	1,900 00	7,638 31
Middlesex, ...	600 00	125 00	95 00	303 44	1,123 44	701 00	554 25	686 99	1,241 24	-	2,700 00	2,300 00	5,000 00
Middlesex North, . .	600 00	-	24 00	730 86	1,354 86	863 00	131 91	1,175 67	1,310 58	$2,260 00	6,614 94	473 00	6,614 94
Middlesex South, . .	600 00	24 60	97 00	606 56	1,328 16	1,046 00	517 21	464 33	981 54	2,813 55	7,000 00	1,500 00	5,462 45
Worcester, ...	600 00	-	55 00	340 95	995 95	992 50	845 44	439 40	1,461 22	5,500 00	20,000 00	200 00	20,000 00
Worcester West, . .	600 00	233 62	45 00	158 62	1,036 74	837 00	468 12	235 14	703 26	231 88	-	4,713 15	3,924 33
Worcester North, . .	600 00	226 70	60 00	184 89	1,071 59	1,105 75	640 79	311 13	951 92	-	-	4,830 31	4,630 31
Worcester South, . .	600 00	132 40	43 00	45 56	820 96	703 75	399 69	245 31	645 00	-	2,300 00	1 337 40	3,637 40
Worcester South-East,	600 00	154 30	139 00	450 24	1,343 54	966 00	586 43	496 56	1,082 99	-	-	3,009 04	3,009 04
Hampshire, Franklin and Hampden,	600 00	240 00	74 00	542 94	1,456 94	850 00	424 25	1,032 69	1,456 94	3,400 00	7,450 00	150 00	4,000 00
Hampshire, ...	600 00	-	12 50	640 19	1,252 69	927 50	386 80	240 88	902 02	140 38	4,511 38	419 31	4,511 38
Highland, ...	600 00	63 90	50 00	156 60	870 50	600 00	441 00	211 72	1,060 56	-	2,000 00	1,500 00	3,500 00
Hampden, ...	600 00	-	160 00	1,096 67	1,856 67	1,049 85	-	1,649 36	1,649 36	9,539 00	32,331 31	300 00	32,331 31

Hampden East, . .	392 00	96 00	70 00	103 00	661 00	688 00	367 63	184 75	552 38	2,336 00	3,000 00	2.126 00	2,790 00
Franklin, ...	600 00	17 00	2,906 50	1,726 32	5,249 82	802 50	535 25	4,518 11	5,053 36	1,000 00	7,000 00	100 00	6,000 00
Berkshire, ...	-	300 00	55 00	2,158 13	2,513 13	1,382 00	1,280 50	1,157 00	2.200 00	1 600 00	13,000 00	300 00	13,000 00
Housatonic, ...	600 00	568 50	51 00	1,521 25	2,740 75	839 00	801 00	845 19	1,646 19	3,000 00	8,000 00	150 00	20,082 33
Hoosac Valley, . . .	413 20	100 00	129 00	780 70	1,422 96	591 00	503 75	351 22	3,454 97	1,900 00	4,500 00	-	2,600 00
Norfolk, ...	600 00	-	35 00	1,522 03	2,157 03	1,998 00	442 00	1,642 80	2,084 80	6,550 00	10,000 00	350 00	4,800 00
Bristol, ...	600 00	310 00	132 00	1,785 75	2,827 75	1,240 25	799 75	997 53	1,797 28	3,000 00	8,900 00	275 00	9,175 00
Plymouth, ...	600 00	309 13	76 00	1,350 60	2,402 83	1,554 00	928 92	787 67	1,898 69	3,254 69	18,500 00	1,000 00	19,500 00
Barnstable, ...	600 00	-	3,651 00	448 70	4,699 70	682 00	447 68	4,082 09	4,529 77	100 00	6,000 00	400 00	6,400 00
Nantucket, ...	447 40	177 80	39 50	335 18	999 88	608 00	249 50	251 35	836 34	-	2,372 69	759 38	2,472 69
Martha's Vineyard, .	600 00	408 66	185 35	797 32	1,391 33	659 00	-	553 60	708 79	1.300 00	3.315 93	2,083 34	5,399 27
Totals, ...	$13,252 60	$5,773 81	$8,277 85	$19,284 27	$46,375 29	$25,058 10	$12,537 77	$23,477 77	$40,042 38	$47,925 50	$172,496 25	$71,415 34	$237,708 17

PERMANENT FUND—HOW INVESTED.

Massachusetts.—Bank stocks, $26,100; policies Massachusetts Life Office, $3,000; legacy, $9,166.87; cash, $1,472.54; U. S. Treasury, $1,500.

Essex.—In bank stock and railroad bonds.

Middlesex.—Notes secured by mortgage, bank and railroad stocks, cash and sundries.

Middlesex North.—Real estate.

Middlesex South.—Building and grounds, pens and fixtures, notes.

Worcester West.—Cattle pens, notes, cash, &c.

Worcester North.—Bank stock, $2,800; notes of hand, $1,615; cash on hand, $215.31; cattle pens, &c., $200.

Worcester South.—Agricultural hall, furniture, cattle pens, fixtures, &c.; cash on hand.

Worcester South-East.—Promissory notes, pens, fixtures, &c.

Hampshire, Franklin and Hampden.—Notes secured by bond and mortgage.

Hampshire—In real estate, notes of life-members, fixtures, &c.

Highland—Real estate mortgage, United States 7 3-10 Treasury Notes, notes of hand.

Hampden.—Lands, buildings, tools, &c.

Hampden East.—Real estate, fixtures, loans, &c.

Franklin.—In real estate.

Berkshire.—In real estate.

Housatonic.—In real estate, and in 725 notes for 16 67-100 each against that number of members on annual interest.

Hoosac Valley.—In real estate.

Norfolk.—In real estate occupied by the society.

Bristol.—In real estate.

Plymouth.—In real and personal estate, cattle pens, fixtures, &c.

Barnstable.—Land, buildings and cattle pens.

Nantucket.—Real estate, personal notes, (endorsed,) unendorsed notes, cash.

Martha's Vineyard.—In land, hall, fence, fixtures, &c.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, FARM IMPROVEMENTS, MANURES, &c.

SOCIETIES.	For management of farms.	For draining.	For subsoiling.	For ploughing at the Exhibition.	For reclaiming swamp lands.	For experiments with manures.	For spading.	For hedges and ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For cranberries.	For other farm improvem'ts.	Total am't offered for farm improvem'ts.	Total amount awarded for farm improvements.	Total amount actually paid for farm improvements.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$30 00	-	-	$81 00	-	$25 00	-	-	$25 00	-	-	-	$360 00	$161 00	$161 00
Middlesex,	-	-	-	41 00	-	-	-	-	-	-	-	-	196 00	41 00	-
Middlesex South,	-	-	-	36 00	$8 00	-	-	-	-	$39 00	-	-	172 00	83 00	83 00
Middlesex North,	-	-	-	-	-	-	-	-	-	-	-	-	90 00	-	-
Worcester,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester West,	-	-	-	13 00	-	-	-	-	-	-	-	-	168 00	13 00	13 00
Worcester North,	15 00	-	-	38 00	-	60 00	-	-	-	-	-	-	155 00	113 00	113 00
Worcester South,	-	-	-	29 00	-	-	-	-	-	-	-	-	-	-	-
Worcester South-East,	-	-	-	42 00	8 00	-	-	-	-	10 00	-	-	108 00	-	60 00
Hampshire, Franklin & Hampden,	-	-	-	-	-	-	-	-	-	-	$2 00	-	10 00	-	-
Hampshire,	-	-	-	-	-	-	-	-	-	-	-	-	73 50	12 50	12 50
Highland,	-	-	-	-	9 00	35 00	-	-	-	-	-	-	78 00	44 00	44 00
Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	278 00	-	-
Hampden East,	-	-	-	18 00	-	-	-	-	10 00	-	50	-	164 50	28 50	28 50
Franklin,	-	-	-	-	-	-	-	-	-	-	-	-	76 00	-	-
Berkshire,	-	-	-	43 00	10 00	43 00	$9 00	-	-	18 00	-	-	145 00	135 00	135 00
Housatonic,	-	-	-	34 00	30 00	-	-	-	-	18 00	5 00	-	-	-	-
Hoosac Valley,	-	-	-	-	-	-	-	-	3 00	5 00	-	-	-	-	-
Norfolk,	-	$12 00	-	56 00	-	-	15 00	-	6 00	-	3 00	$16 00	477 00	108 00	125 00
Bristol,	-	-	-	71 00	-	-	-	-	-	-	10 00	-	373 00	81 00	81 00
Plymouth,	-	-	-	55 00	-	20 00	5 00	-	-	10 00	-	-	218 00	90 00	76 26
Barnstable,	-	-	-	15 00	-	10 00	5 00	-	6 00	-	-	36 00	104 00	36 00	36 00
Nantucket,	-	-	-	7 00	-	-	-	-	-	-	-	-	21 00	7 00	7 00
Martha's Vineyard,	-	-	-	6 00	-	-	-	-	-	8 00	9 25	-	181 00	23 25	-
Totals,	$45 00	$12 00	-	$585 00	$65 00	$193 00	$34 00	-	$50 00	$108 00	$29 75	$52 00	$3,448 00	$976 25	$975 26

FOR FARM STOCK.

SOCIETIES.	For Bulls.	For Milch Cows.	For Heifers.	For Calves.	For Working Oxen.	For Steers.	For Fat Cattle.	For Horses.	For Sheep.	For Swine.	For Poultry.	All other Stock.	Total amount offered for Live Stock.	Total am't awarded for Live Stock.	Total am't paid out for Live Stock.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$45 00	$15 00	$28 00	$8 00	$36 00	$23 00	$23 00	$85 00	$15 00	$19 00	$15 50	-	$399 00	$312 50	$290 00
Middlesex,	18 00	42 00	11 00	15 00	18 00	7 00	6 00	99 00	-	22 00	20 00	-	328 00	258 00	-
Middlesex North,	-	-	-	-	-	-	-	-	-	-	-	-	401 00	-	-
Middlesex South,	40 00	8 00	23 00	7 00	10 00	9 00	14 00	66 00	28 00	31 00	14 00	-	383 00	250 75	224 75
Worcester,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester West,	27 00	33 00	16 00	22 00	35 00	30 00	49 00	55 00	5 00	33 00	6 00	$45 00	422 00	356 00	289 00
Worcester North,	38 50	33 00	36 00	30 00	20 00	21 00	18 00	86 50	10 50	9 00	12 25	-	437 50	314 75	302 75
Worcester South,	29 00	4 00	14 50	5 50	29 00	21 00	15 00	40 00	13 00	21 00	7 50	10 00	351 00	209 50	209 50
Worcester South-East,	24 00	60 00	-	15 00	-	37 00	8 00	103 00	3 50	32 00	11 50	25	314 00	294 25	280 00
Hampshire, Franklin & Hampden,	31 00	21 00	21 00	6 00	51 00	35 00	85 00	142 00	22 00	26 00	-	41 00	495 00	484 00	333 00
Hampshire,	24 00	5 00	13 00	11 00	23 00	23 00	9 00	175 00	20 00	14 00	9 50	20 00	493 00	346 50	272 50
Highland,	15 00	22 00	12 50	2 25	23 00	17 50	17 00	111 00	14 00	4 00	3 50	24 25	358 75	266 00	261 00
Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	458 50	-	-
Hampden East,	29 00	12 00	14 00	8 50	23 00	7 00	15 00	53 00	17 00	18 00	8 50	37 00	293 00	242 00	242 00
Franklin,	74 00	32 50	19 50	10 75	19 25	51 00	21 50	70 25	62 00	29 75	10 00	51 50	462 75	453 00	403 75
Berkshire,	36 00	39 00	40 00	12 00	45 00	10 00	24 00	214 00	94 00	33 00	23 00	66 00	751 00	666 00	666 00
Housatonic,	18 00	20 00	24 00	7 00	40 00	28 00	13 00	105 00	47 00	21 00	10 00	53 00	399 00	386 00	386 00
Hoosac Valley,	16 00	22 00	20 00	-	10 00	12 00	7 00	127 00	32 00	8 00	19 50	19 00	328 00	284 50	277 50
Norfolk,	24 00	28 00	21 00	-	-	-	-	117 00	5 00	26 00	38 00	-	556 00	264 00	200 00
Bristol,	40 00	23 00	22 00	13 00	62 00	32 00	55 00	80 00	21 00	18 50	27 00	-	345 00	393 50	393 50
Plymouth,	22 00	49 00	18 00	16 00	29 25	18 00	50 00	186 00	27 00	11 00	-	-	512 00	426 25	557 25
Barnstable,	18 00	14 00	16 00	10 00	21 00	9 00	27 00	25 00	11 00	16 00	12 00	33 00	263 00	212 00	212 00
Nantucket,	6 00	22 00	9 50	-	7 00	8 00	-	31 00	13 00	9 00	12 00	8 00	216 00	125 00	112 00
Martha's Vineyard,	8 00	-	7 00	-	7 00	4 00	17 00	13 00	16 00	12 00	7 00	-	179 75	91 00	*
Totals,	$585 50	$504 50	$396 00	$200 00	$508 50	$402 50	$478 50	$1,983 75	$476 00	$413 25	$266 75	$408 00	$9,086 25	$6,631 50	$5,912 50

* The Trustees of the Society have ordered that no premiums shall be paid until after January 1, 1863.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—CONCLUDED.

FOR FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	$10 00	–	–	–	–	–	$8 00	–	–	–	$8 00	–	–	$8 00	$8 00	$16 00
Middlesex,	5 00	$3 00	–	$3 00	–	–	–	–	–	–	–	–	$14 00*	–	–	–
Middlesex North,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Middlesex South,	8 00	5 00	–	–	–	–	–	–	$39 50*	–	–	–	–	–	–	–
Worcester,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Worcester West,	–	–	–	–	–	–	–	–	25	–	–	–	1 00	–	–	–
Worcester North,	20 50	–	–	3 00	–	–	4 95	–	3 00	$5 30	4 25	$3 25	–	1 50	3 25	3 75
Worcester South.	–	–	–	–	–	$2 00	–	–	2 50	4 50	4 50	–	–	12 00	–	–
Worcester South-East,	13 00	–	$8 00	5 00	$5 00	6 00	–	–	–	6 00	–	–	–	–	–	6 00
Hampshire, Franklin & Hampden,	19 00	–	–	–	–	–	–	–	1 00	4 00	–	–	4 50	–	1 00	–
Hampshire,	2 00	3 00	1 00	1 00	–	5 00	5 00	$1 00	1 00	1 00	1 00	–	1 00	1 00	–	1 00
Highland,	7 00	7 00	3 00	3 00	7 00	3 00	1 00	75	7 00	5 00	1 00	25	75	5 00	–	6 00
Hampden,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hampden East,	7 25	7 00	7 25	–	5 50	2 00	–	–	1 50	75	50	50	2 25	–	1 50	25
Franklin,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Berkshire,	28 00	21 00	21 00	15 00	21 00	3 00	–	6 00	15 00	6 00	6 00	–	3 00	6 00	5 00	21 00†
Housatonic,	34 00	22 00	13 00	6 00	21 00	5 00	–	13 00	15 00	13 00	3 00	–	6 00	–	6 00‡	–
Hoosac Valley,	11 50	10 00	6 00	6 00	10 00	–	–	1 00	10 00	–	–	–	–	–	–	–
Norfolk,	6 00	4 00	–	–	–	2 00	–	–	–	–	–	–	–	–	–	18 00
Bristol,	18 00	10 00	–	–	–	–	–	–	–	6 00	–	–	–	–	–	–
Plymouth,	18 00	13 00	5 00	13 00	5 00	13 00	–	–	8 00	4 00	–	–	–	12 00	6 00§	5 00‖
Barnstable,	10 00	12 00	3 00	2 00	8 00	–	–	–	–	–	–	–	5 00	–	–	–
Nantucket,	23 00	8 00	–	5 00	–	–	8 00	–	–	–	–	–	–	–	–	–
Martha's Vineyard,	24 75	3 00	2 00	–	–	–	4 00	–	6 50	3 50	–	–	2 75	–	–	–
Totals,	$265 00	$128 00	$69 25	$62 00	$82 50	$41 00	$30 95	$21 75	$112 25	$59 05	$30 25	$4 00	$40 25	$45 50	$30 75	$77 00

* Collections of Vegatables. † Gardens. ‡ Buckwheat. § Cabbages. ‖ Squashes.

FARM PRODUCTS—Concluded.

SOCIETIES.	Total amount offered for Grain & Root Crops.	Total am't awarded for Grain & Root Crops.	Total am't paid for Grain and Root Crops.	Broomcorn Brush.	Fruits.	Flowers.	Any other cultivated Crops.	Milk.	Butter.	Cheese.	Honey.	Wheat Bread.	Rye and Indian Bread.	Corn Bread.	Total am't paid out under the head of Farm Products.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	$130 00	$58 00	$47 00	–	$101 50	$19 00	$20 50	–	$18 00	$18 00	–	–	$6 00	–	$180 00
Middlesex,	19 00	11 00	–	–	110 00	20 00	–	–	20 00	–	–	$11 00	3 00	–	–
Middlesex North,	127 00	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Middlesex South,	126 00	52 50	52 50	–	60 25	10 00	–	–	14 00	–	$15 00	6 00	3 00	–	217 25
Worcester,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Worcester West,	55 00	–	–	–	19 75	13 00	5 75	–	3 00	41 00	–	6 00	6 00	–	80 37
Worcester North,	140 75	52 75	52 45	–	83 50	10 50	–	–	13 50	1 00	3 50	1 00	1 00	–	157 20
Worcester South,	50 00	25 50	25 50	–	31 50	11 00	2 50	–	9 00	9 00	–	12 00	6 00	–	106 50
Worcester South-East,	90 00	49 00	49 00	–	69 00	10 00	–	–	6 00	7 00	50	3 50	3 50	–	141 00
Hampshire, Franklin and Hampden,	112 00	28 50	–	–	35 50	9 50	6 75	–	10 00	6 00	2 00	3 00	3 00	–	54 50
Hampshire,	89 50	25 00	23 50	–	12 00	8 00	1 00	–	6 00	5 00	3 00	3 00	3 00	$3 00*	59 75
Highland,	60 00	56 75	56 75	–	10 75	2 00	–	$3 50	6 50	6 50	1 50	75	75	50	90 25
Hampden,	202 35	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hampden East,	65 75	36 25	36 25	–	11 75	1 25	–	–	5 00	10 00	–	–	–	–	64 25
Franklin,	73 00	–	–	$46 25	4 50	–	–	–	11 00	10 50	13 50	7 25	–	–	–
Berkshire,	194 00	177 00	177 00	–	35 00	10 00	–	–	21 00	26 00	6 00	3 00	3 00	3 00	284 00
Housatonic,	180 50	157 00	157 00	–	40 00	18 50	15 50	–	15 00	15 00	4 00	1 50	1 50	2 00	270 50
Hoosac Valley,	105 00	76 00	76 00	–	12 00	7 00	–	–	9 00	9 00	3 00	3 00	3 00	4 00	180 50
Norfolk,	82 00	30 00	55 00	–	45 00	39 00	–	–	16 00	8 00	–	11 50	5 00	5 00†	113 50
Bristol,	208 00	34 00	34 00	–	77 75	2 75	31 50	–	24 00	18 00	18 00	7 00	4 50	6 00‡	223 50
Plymouth,	185 00	114 00	67 00	–	80 00	23 37	–	–	21 00	21 00	–	5 75	6 25	–	177 59
Barnstable,	94 00	40 00	40 00	–	25 75	21 25	13 60	–	10 00	6 00	–	8 00	6 00	6 00	136 60
Nantucket,	142 00	44 00	44 00	–	19 75	8 25	–	–	11 00	–	–	1 50	–	–	84 50
Martha's Vineyard,	109 00	46 50	‖	–	21 50	6 00	–	–	10 00	5 00	–	3 62	3 63	–	‖
Totals,	$2,339 85	$1,113 75	$992 95	$46 25	$916 75	$250 37	$97 10	$3 50	$259 00	$222 00	$70 00	$98 37	$68 13	$29 50	$2,641 76

* Rye Bread. † Wheat and Indian Bread. ‡ Sundries. ‖ See note under the head of Farm Stock.

MISCELLANEOUS.

SOCIETIES.	Amount awarded for Agricultural Implements.	Amount offered for raising forest trees.	Amount awarded and paid out for the same.	Amount for experiments on manures in accordance with the requirements of the board, payable in '62.	Am't awarded for all other objects strictly agricultural not specified before.	For mechanical inventions, domestic manufactures, &c.	No. of persons who received premiums and gratuities.
Massachusetts, . .	-	$1,000 00	-	$225 00*	$150 00	-	-
Essex, ...	$15 00	30 00	-	60 00	-	$88 50	234
Middlesex, . . .	15 00	-	-	60 00	-	46 00	-
Middlesex North, . .	-	-	-	60 00	-	-	†
Middlesex South, . .	4 00	70 00	-	60 00	-	67 00	194
Worcester, . . .	-	-	-	-	-	-	†
Worcester West, . .	15 00	30 00	-	60 00	-	56 00	161
Worcester North, . .	1 75	50 00	-	75 00	4 40	75 90	213
Worcester South, . .	-	35 00	-	75 00	4 00	50 69	124
Worcester South-East, .	1 00	30 00	-	60 00	-	5 50	315
Hampshire, Franklin and Hampden, .	6 00	20 00	-	90 00	-	68 25	194
Hampshire, . . .	16 00	10 00	-	30 00	-	85 15	159
Highland, . . .	1 00	-	-	45 00	-	44 75	161
Hampden, . . .	-	-	-	-	-	-	-
Hampden East, . .	4 00	25 00	-	60 00	20 25	28 48	85
Franklin, . . .	5 00	10 00	-	45 00	-	53 00	190
Berkshire, . . .	23 50	-	-	60 00	-	118 00	230
Housatonic, . . .	10 00	-	-	-	-	85 00	206
Hoosac Valley, . .	3 00	-	-	50 00	-	55 00	194
Norfolk, ...	-	30 00	$10 00	60 00	-	40 00	130
Bristol, ...	-	48 00	-	60 00	-	101 75	311
Plymouth, . . .	-	60 00	55 00	60 00	11 00	118 94	320
Barnstable, . . .	-	8 00	5 00	60 00	-	58 18	271
Nantucket, . . .	-	8 00	-	60 00	15 50	41 00	115
Martha's Vineyard, .	-	40 00	-	60 00	3 25	80 01	137
Totals, . . .	$120 25	$1,504 00	$70 00	$1,475 00	$208 40	$1,367 10	3,944

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* $300 payable in 1863, and $300 payable in 1864.

† No exhibition was held.

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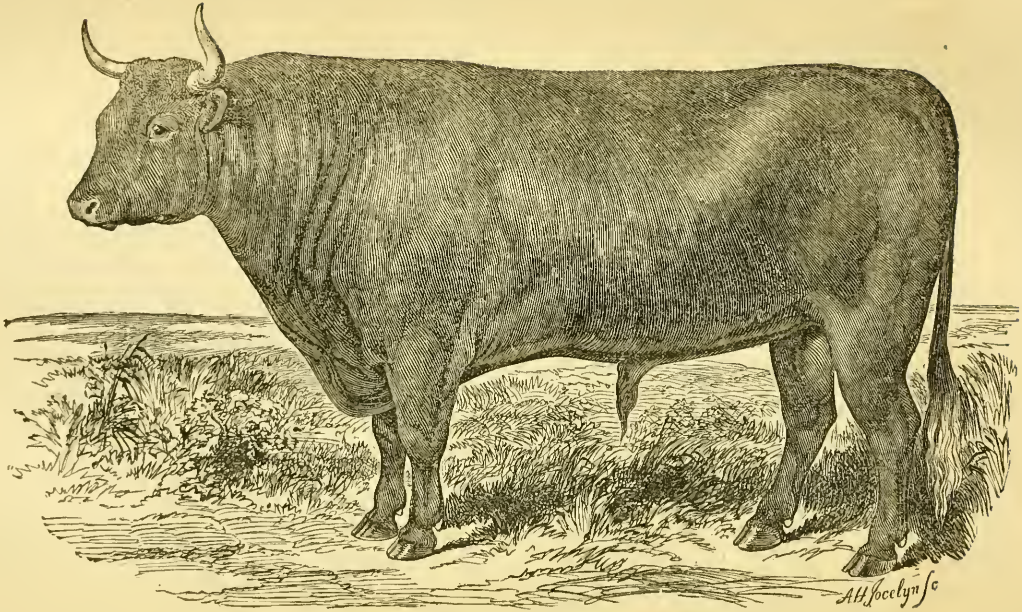

FIRST PRIZE DEVON BULL "HURON,"

Bred by E. G. Faile, West Farms, N. Y.; owned and kept by Arthur Gilman, of Glynllyn Farm, Lee, Berkshire Co., Mass.

ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

1862.

EDITED BY

CHARLES L. FLINT,

SECRETARY OF THE STATE BOARD OF AGRICULTURE.

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1863.

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1863.

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AGRICULTURAL EXHIBITIONS.

The Exhibitions of 1863 *begin* on the following days:—

Essex, at *Andover*,	Tuesday, Sept. 29th.
Middlesex, at *Concord*,	Thursday, Sept. 17th.
Middlesex North, at *Lowell*,	Thursday, Sept. 24th.
Middlesex South, at *Framingham*,	Tuesday, Sept. 22d.
Worcester, at *Worcester*,	Thursday, Sept. 17th.
Worcester West, at *Barre*,	Thursday, Sept. 24th.
Worcester North, at *Fitchburg*,	Tuesday, Sept. 29th.
Worcester South, at *Sturbridge*,	Thursday, Oct. 1st.
Worcester South-East, at *Milford*,	Tuesday, Sept. 29th.
Hampshire, Franklin & Hampden, at *Northampton*,	Thursday, Oct. 1st.
Highland, at *Middlefield*,	Thursday, Sept. 10th.
Hampshire, at *Amherst*,	Thursday, Oct. 8th.
Hampden, at *Springfield*,	Tuesday, Oct. 6th.
Hampden East, at *Palmer*,	Tuesday, Oct. 13th.
Franklin, at *Greenfield*,	Thursday, Sept. 24th.
Berkshire, at *Pittsfield*,	Tuesday, Oct. 6th.
Hoosac Valley, at *North Adams*,	Tuesday, Sept. 22d.
Housatonic, at *Great Barrington*,	Wednesday, Sept. 30th.
Norfolk, at *Dedham*,	Thursday, Sept. 24th.
Bristol, at *Taunton*,	Tuesday, Oct. 6th.
Plymouth, at *Bridgewater*,	Thursday, Oct. 1st.
Barnstable, at *Barnstable*,	Tuesday, Oct. 6th.
Nantucket, at *Nantucket*,	Tuesday, Sept. 29th.
Martha's Vineyard, at *West Tisbury*,	Tuesday, Oct. 20th.

AGRICULTURE OF MASSACHUSETTS.

THE RELATIONS OF AGRICULTURE TO MAN.

From an Address before the Essex Agricultural Society.

BY GEORGE J. L. COLBY.

The first and most obvious relation of agriculture to man is that which it sustains to his physical nature. From the products of the earth he supplies his temporal wants, and agriculture is but the art of drawing from the earth its most valuable productions in the greatest abundance. This, then, is man's primary occupation on which depends his existence. It is the parent and head of other arts—the highest and noblest of them all. It is true that a few savages might exist upon the spontaneous productions of the soil without its cultivation, but civilized society could not so exist.

Again consider the relation of agriculture to man's physical development, and the physical development carries with it intellectual and moral development, for a sound mind is dependent on a healthy body. All life and all character are susceptible of modification, and man's more than all, since it is higher in the scale of creation and has the largest sphere of individual action. The brute cannot be debased or elevated beyond certain points, but man may sink below the brute, or rise to the very heavens. What, then, has been the modifying influence by which savages have risen to civilization? What has made the difference between the Digger Indian of California and the people of New England?—between the Hottentot and the European? There is a natural difference of races, but beyond that agriculture has been the first modifying cause.

Civilization must begin in breaking up the sod, planting the seed, and providing better food. It may be unpoetical, but it is not unphilosophical to say, that man may be improved physically by improved and abundant food, as much as the strawberries that grow in your gardens, or the cattle in your barns. It is impossible for a man to be good or great with a badly organized brain and a weak or diseased body, and those depend in a measure upon the food we eat.

If the Digger Indian subsists on worms and roots, he will partake of their nature. If the barbarian feeds upon that which is watery and fibrous, having but little nutriment, he will have no spare vitality, and the brain will remain an undeveloped germ. It is as true of man as of any living thing on the earth, or over or under the earth, that for a full development of his powers he needs abundant and generous food. Our highest type of manhood is in the well fed nobility of Great Britain ; physically they have no equals in the world ; and we never think of wise and great men only as answering the historical description of Plato, whose body and mind were well developed. So we think of all the world's worthies down to our Washington, and Franklin and Webster. For this perfection of manhood agriculture changes the poisonous South American root to the Chenango or the Jackson white potato ; it gives the Baldwin for the crab apple, and the Bartlett for the choke pear ; it transforms the small flinty and almost innutritious Rocky Mountain corn to the golden staple of New England, and the bitter grass seed, which is the parent of the wheat, to the staff of life ; while the diminutive sheep and hard sided oxen it has doubled in weight and juiciness and value, in the last two centuries. Everywhere it forces the earth to bring forth a hundred fold, so that man, no longer exhausted in obtaining a precarious existence, awakes under the stimulus of richer and warmer blood, and advances to higher thought and action.

The cultivation of any article of human consumption, to increase its nutritiousness and its adaptation to the human system, is so much done for the advancement of man ; and the introduction and naturalization of useful plants from other lands is so much for the future development of the people at home. Thus we find everywhere that the production and use of wheat indicates the intellectual condition of the nation. It contains more brain-food than other grains. It has been asserted, too, that the use of tea and coffee has increased the average brain of the South of Europe. We may further instance the use of milk, which nourishes brain, and bone and muscle, and which is greatly increased by improved cattle. There is and must be one essential difference, I repeat, between peoples who live on rice, potatoes and water, and those who live on wheat, beef and wine. But agriculture not only gives man higher and better life, but to his own children it gives longer life. "Length of days are in her right hand." This marks its elevated character, for very truly, says Cicero, "by no other way can men approach nearer to the gods than by conferring health on man." "God made the country,—man made the town." The former is in accordance with the laws of nature; the latter is artificial, and to an extent destructive.

Agriculture requires labor in variety; it develops all the muscles and brings into play all parts of the human machine, and this labor is not in excess to break down the constitution; hence the larger, taller, better-formed, handsomer men, are from the country, where they have pure air to breathe, simple and pure food to eat, an honest earth under them, and God's sunshine or the magnificence of the star-light heavens above. In the town, idleness on the one hand enervates, and on the other, much toil destroys; men are hived in narrow streets and crowded in tenant houses and close workshops, which beget disease and deformity. The country admits of a happy medium; a tranquil, middle life, where there is an abundance for the support of physical nature, thought enough for the maturity of mental powers, and associations that lift the soul heavenward.

> "O he can speak the vigorous joys of health—
> Unclogged the body, unobscured the mind;
> The morning rises gay, with pleasing stealth,
> The temperate evening falls serene and kind."

On the other hand, all things in the city are in extremes; wealth and poverty, luxury and starvation, refinement and barbarian degradation, education that sharpens the wit, and idiotic stupidity that makes man the easy prey of his fellow, who has no more love for his kind than though he had been born of brutes and suckled by she-wolves. On one side religion ends in bigotry, and on the other liberality of opinion in Atheism. Trades, callings, classes, war upon each other, and life is like a great amphitheatre filled with savage beasts and warring men. In body and mind and spirit the equilibrium of humanity is lost, and we are like the waves in a tempest.

The physical result is given in the annual vital returns of the State. The average duration of life in Boston is twenty years, and but for the influx from the country its streets would in a few years be deserted, and its houses tenantless. In the country the average of life is more than twice as long. So, we compare the classes and occupations. The life of the farmer is more than sixty years, of shoemakers and ordinary mechanics from forty to fifty years, and of printers, editors, operatives in factories, from thirty to thirty-five years. And here, mark you that physical inferiority is invariably and quickly followed by mental inferiority. The mind is the measure of the man, it is true ; but the body as well represents the character of the mind as the tenement will the tenant who occupies ; hence we find that in all powerful nations, physical culture has been the foundation of education. The golden age of Greek history was when the youth were trained to manly sports and exercises. Philosophy, poetry, oratory, music and sculpture followed and flourished with the games to which the youth were invited. The Romans adopted the Greek system, and with the same success. Physical health is the chief corner stone of mental power and moral greatness, and that is the product of the farm as much as are sheep and oxen. Having considered the influence of agriculture upon physical man individually, let us look a moment to its relations to man in society—to civilization and to government.

Man's progress in civilization has been and must be through the paths of agriculture ; that comes first, as the foundation of society. Manufactures, which are a modification of the products of the soil, and commerce which is a distribution or exchange of them, must, in the necessity of the case, be secondary. Land is the chief creative element in society, and arts and trades, navigation and science, will move in unison with agriculture. The most obvious distinction between the savage and civilized man, is in the respective relations in which they stand to the soil. The one has no fixed abode ; and as long as he has none he makes no progress ; the other attaches himself to a spot which he calls home. This he loves from the associations of the past ; it is the place where his fathers lived and died and were buried, or which he has obtained by his own toils. He values it too for the present ; it is the home of his wife — it was the birthplace of his children — it is the most loved spot of earth ; the stars sparkle brighter above it in the distant spheres, the flowers are more beautiful and fragrant from its soil, the rains are more grateful to its fields, and the fruits sweeter to the taste. Around the house, the barn, the trees, the hills, the running brooks, and the very rocks, pleasant memories and holy affections cluster ; and he loves to adorn and beautify and improve it. The very first steps of improvement, therefore, for an individual or a tribe, is to cease wandering and become rooted to the earth. As soon as a tribe fixes itself with a determination to draw support from the soil, it lays aside its tents and builds substantial dwellings ; and here begins architecture, and the many arts needed in building — the cutting of timber, the making of bricks, or the hewing of stones — masonry, carpentry, painting, glass making, and the countless branches of industry involved in furnishing and beautifying a residence.

Again, before agriculture can progress far, the husbandman must have tools, and to this end the mines must be worked, and the founder and the smith be enlisted ; many trades called into existence, and finally, as we see in our day, the highest mechanical ingenuity be pressed into the service of the farmer. Commerce, in the progress of civilization, necessarily grows out of agriculture. A farming community will produce more than they need for consumption, and the surplus will be sent to less favored localities, or to sections and countries whose soil and climate do not admit of such productions. Hence comes commerce, the first born child of agriculture, with the building of ships for the rivers, lakes and oceans — the cutting of canals, and the running of railways over valleys and through mountains for transportation ; and then towns and cities spring up full of warehouses, the product of the farm house.

And now the farmer and the merchant find it unprofitable and impossible, while actually engaged in other pursuits, to make their own clothes, hats, shoes, and the thousand articles of utility and luxury that become elements of daily life, and manufactures spring into existence. The hand mills, the hand looms, and the spinning wheels by the kitchen fires, give place to great milling establishments, and the cotton and woollen factories moved by water or steam ; and again, as with the merchant and trader, the manufacturer and operatives are changed from producers to consumers, and the surplus is poured into the lap of commerce ; and, in the exchange and distribution, wealth accumulates, industry is encouraged, knowledge increased, and humanity improved. Thus, all the material surroundings of civilization—all that distinguishes our enlightened community from a savage state, are directly the outgrowth of the soil — springing from agriculture, as much as does the farmer's crop that is gathered into cellar or barn.

Now, let us consider another relation of agriculture to society, in government. The first idea of law is suggested by property ; and the first property to be protected by law is in land. To the savage who lives by hunting and fishing, pursuing his game at will over vast territories, in common with his wild brethren, the ground is no representative of value. He derives nothing from it, and he claims ownership in it no more than he does in the sunlight, air or waters. It is when he makes to himself a home, and sets apart a portion of the footstool for himself and his family, baptizing it with the sweat of his brow, and sanctifying it with his toil ; it is when he has learned to plant it in the spring, and watch the growth of its products in the summer, and gather the harvests in autumn, and enjoy them in winter, that he desires the uninterrupted possession for himself and his children, and sees the value of law to secure the permanent enjoyment of his own — to prevent trespass and thefts, to decide questions of boundaries, and to regulate the relations arising out of the new order of things.

But not only does agriculture inevitably suggest the idea of law, but it favors the highest, freest and most permanent forms of government — always and ever being the enemy of despotism where the husbandman tills his own acres. What of government there is in a savage state is despotic. One man by superior strength, courage or wisdom, becomes the absolute chief of his tribe. So at the other extreme, we find the tendency in manufacturing and mercantile States is to aristocracy and monarchy. Great wealth accumulates in the hands of the few; they enjoy learning and luxuries and grow proud, wishing to domineer over the masses whom they employ, and whose labors they direct. The minority seeks to rule, and often does tyrannize over the majority. But in an agricultural community, the doctrine of equality is better exemplified than in any other social condition. The gains of the farmer are slow and sure; he has not enormous wealth to puff him up, and he never can be the victim of abject poverty, which often depresses other classes; his position gives him opportunities for a healthy education, and his absence from the excitements of life allow reflection and mature thought, fitting for self-government. The farmer is independent of all sects in religion, and all parties in politics; he relies on none of them for bread in this life or for hope in another. His own right hand sustains him under the blessing of God, and to God he owes every thing; but to gambling politicians, and bigoted and proud-souled sectarians, he owes nothing. If there is any man who, in such a country as this, is sovereign, independent, lord of himself and his own, it is the farmer who cultivates his own unmortgaged fields, drives his own oxen, owing no man any thing.

The isolated life of the farmer as well as his independence of position, begets self-government and cherishes a love therefor. He first has from necessity to rule himself, look after his own family and his little kingdom, where he is patriarch, legislator, judge. Living on his own domains with his pastures, woodlands, hills and streams about him, with his children to be educated, he is supreme in his own little circle. He has none above him but God, and he receives his privileges and his rights from no human hand, and hence never learns to look to another man as his superior. When others become his neighbors, they form the township, the county, and the State, continuing the same self-government when they have become an integral part of the great nation. Here is the beauty and perfection of our system of government — we have independent and self-constituted and self-controling circles within the greater circle. The parent has rights that the selectmen of the town may not question; the town has rights that the State may not invade; the State has rights that are beyond the reach of Congress, and which the President cannot disregard without committing treason against the Commonwealth, as much as would the State if it should deny the powers that have been ceded to the general government in the constitution.

All history furnishes illustrations of the truth of our position, that an independent yeomanry is the basis of free institutions. Whenever a people have succeeded in republican forms of government, or in curtailing the sovereign power for any length of time, whether among the vineyards and olive groves of ancient Greece, the mountain homesteads of the Swiss peasantry, or the broad acres of Columbia's virgin soil, or the vast ranches of South America, the majority of the inhabitants have been devoted to agriculture; and it is equally true that the cultivators of the soil have been the most prompt, the most active, and most enduring in defending their rights and institutions, whether local or national.

It would be an interesting topic, did the time permit, to show the relations of agriculture to nations — to illustrate this fact: that land and its cultivation are the life powers of nations, which give strength, liberty, wealth and permanence. This is true of the most ancient — it is true of the most modern. As agriculture has been most advanced, civilization has most advanced, and flourishing and stable nationalities have been established. Such is the evidence in the case of China, whose husbandry has attained great perfection, as it must that a third of the whole human race might be fed from its soil. Here is an empire that has lived and flourished ever since the morning of time. History runs not back to its beginnings; and to-day it teems with life, abounds with wealth, and boasts of its philosophy, literature and sciences. Through all the ages agriculture has been most honored by the Chinese. It has been recognized by the sages, patronized by the statesmen, and praised by the poets. Even the Emperor, claiming relationship to the gods, every year comes down from his throne to mingle with the people at their grand agricultural festival, and holds the plough and turns the furrow with his own hands. The Hindoos present another illustration. We find them a polished and refined people, possessing a very perfect system of religion, with sages dealing with the most subtle questions of philosophy, having a beneficent code of laws, and skilled in commerce and manufactures, fifteen hundred years before Moses, and more than three thousand years before the Christian era. The antiquity of the people about the Ganges is settled by astronomical tables that admit of no mistake; and equally well settled is it that this people, who so flourished centuries before the first gray dawn of civilization on Europe, and when America was all unknown, made agriculture, carried to the highest perfection, the basis of all their prosperity. These nations have been invaded and plundered time and again, but have as often renewed themselves from the cultivation of the soil, and still have material and mental greatness. On the other hand, the nomadic tribes of Central Asia — the Huns, the Moguls, and the Tartars, who have at different times overrun the world with their fierce warriors, have never been able to form permanent empires.

We come westward, and the same phenomena are presented. Babylonia and Persia, Palestine and Egypt, have risen to power and flourished long, when agriculture was the basis of their civilization; and they have passed away when that ceased to be, or sunk equally with that. Before Greece had risen or Rome dominated over the nations, the law of the Medes and Persians controlled an empire equalling in grandeur any that had gone before or has come since. It covered all of western Asia, and included one and hundred twenty-seven satraps who ruled in the name of one great king. What was the foundation of that power is seen by us in the remains of canals, and reservoirs and aqueducts for irrigation; for Babylon, wrote Herodotus, more than three thousand years ago, was chiefly watered by irrigation; and he declared it the most fruitful of all countries. For centuries later, the elder Pliny said: "there is not a country in all the East comparable to it in fertility." Some of the most stupendous works that the intellect of man ever devised were there constructed for the irrigation of the soil, in an almost rainless region, which, from a desert, was converted into a garden and made to blossom as the rose.

How agriculture was honored will be seen by one of Xenophan's stories that will be remembered by every school boy. He tells how the Grecian envoy, Lysander, was received by Cyrus the Younger, at Sardis, who pointed out to him the beauty of his plantations, the avenues of trees, the fragrant shrubbery, and the delightful walks of the royal grounds; and when the Spartan warrior, with his native Greek love for art said: "I admire the beautiful scene, but much more the artist by whose skill it was created." Cyrus, king of all the East, replied: "It was laid out and measured by myself, and a portion of the trees planted by my own hands; nor do I ever go to my dinner," he continued, "till I have earned my appetite by some military or agricultural exercise." There was the basis of the Persian empire in agriculture — the employment of kings, and nobles and peasants; and not till great wars occurred, when agriculture was neglected, and the husbandman was turned to the soldier, and, in oppressive taxation, their great works for watering the soil were neglected and went to decay, did the power of the nation cease. Then the drifting sands came to hide the monuments of departed wealth and power and glory, and the places where the olive and the vine grew, and rich luxuriant verdure gladdened the eye, changed to the wild and dreary desert.

Agriculture did the same for Egypt as for Persia. By it she attained the highest civilization and succeeded to the greatest power, long before Grecian art or Roman heroism were known. One of the Egyptian monarchs even changed the bed of the Nile from along the Lydian chain of mountains to the center of the valley, that agriculture might receive its benefits; and it was into Egypt that the roving tribes went for bread, and became tributary therefor, even before the foundation of the Pyramids were laid. With agricultural prosperity, came science, arts, and industry. "All the learning of the Egyptians" comprised at one time all the learning of the world. Into Egypt God sent the miserable nomadic Jews to learn agriculture, before they could be fitted for the great mission to which they were called. Without that agriculture the little territory of Palestine could never have supported its great population, and the Hebrew nation would not have arisen above the level of their kinsmen, the barbarian Arabs of the south; without that Jerusalem would not have been, the temple and the altar would not have existed; the throne of David, at most, would have been acknowledged only by roving tribes, and Solomon would have been without the wealth or wisdom of his day.

In the line of great nations Greece followed, whose agriculture was honored, as is evidenced by their festivities and sacred mysteries, and the deification of Ceres, the goddess of agriculture, and of Bacchus, the god of wine. Next came Rome, that owed what she was to agriculture. Her poets sang the praises of her husbandmen. Virgil, whose poetry revolutionized Roman agriculture, writes thus:

> "Now, O Mæcenas, I begin to sing
> What shall make joyful cornfields in the spring;
> And tell the husbandmen beneath what sign
> To turn the earth and train the clinging vine;
> What care the oxen and the flocks will please;
> And great experience of the frugal bees."

Her orators, like Cicero, could say: "I have now come to the farmer's life, with which I am exceedingly delighted, and which seems to me to belong especially to the life of a *wise* man." Her statesmen and warriors were as renowned in agriculture as in the Senate and on the battle-field. Cincinnatus, who drove the enemy from the gates of Rome; Paulus Æmilius, whose triumph was graced by the Macedonian king; Scipio, who broke the power of Carthage; Cato, the favorite of the people—the warrior and the statesman, whose writings were authority to the husbandmen of his day—were all practical agriculturists.

This is the voice of all history, and we hazard nothing in saying that nations have risen universally, as agriculture has been fostered, and fallen as it has declined. There have been short-lived peoples, that with small territories or neglected soils, have for a brief space shone with brilliancy in wealth, luxury and war, but they have soon passed away. The empire of Alexander was like a blazing star, and like a meteor dazzled but for a moment. Tyre, Carthage, Palmyra, are like examples. In more modern times we have had Venice, Florence, Genoa and Holland, like trees with great tops, but whose roots took little hold of the soil, and hence they soon withered. Great Britain might be like unto them, but for the fact that the governing classes are attached to the soil, have their homes in the country, live a portion of the year and rear their children on their ancestral estates, and are actually the best farmers the world has ever known. At the risk of surprising some who hear me, I assert that agriculture—not her armies, not her wooden walls, not her commerce, and not her manufactures, as vast as they are—has made Great Britain the mighty power, the modern Rome, she is. Her statesmen all see this; and agriculture is the goal to which every professional man and every merchant desires to attain. This was the employment of the good Prince Albert, and it is the favorite pursuit of the nobility. Not there, as is too often the case here, is it the desire of the sons of farmers to hasten from the paternal acres to the city, but the reverse; and the daily prayer is, that kind Providence may permit a return to the peace and happiness of rural life.

To-day there are two great races with a future before them, and three great nations of those races, and all they are springs from their attachment to the soil. The Sclavonian race in the Russian Empire are in the far East, extending their dominions from the Baltic eastward till they half encircle the globe, and come down to British America in the West, claiming from the Arctic Sea in Europe and Asia and America to boundaries on the South which they are constantly pressing out, looking to the Mediterranean in Europe, the Persian Gulf in Asia, and to whatever they can get on this continent. Those tribes that advanced westward from Russia in former times, as the Avars and Bulgarians, were nomadic, attached to the soil no further than the breeding of cattle required, and consequently remained barbarian, and soon perished, as in more ancient times the Goths, Vandals, and Lombards, who went down upon Rome, were nomads and hunters, and all perished except where agriculture civilized and saved them; but the Sclavonians are agricultural, as the Russians, and Poles, and other peoples that now form the vast empire which promises to divide the world and give it laws, with the Anglo-Saxons of the West.

The Anglo-Saxons are like them in their estimate of the value, and in their uses of land. In the early age in which Tacitus wrote, he said they "shunned the city, and sought their abodes by the sparkling fountains, along the green glades, and in the solemn depths of the forest." The same are they to-day in England and her forty provinces, which make the mother empire so vast the sun never sets on it—an empire whose morning drum beat and evening guns resound around the world. The same are they in the United States, where the love of the soil has in the lifetime of one generation of men pressed us over the Alleghanies, across the broad valley of the Mississippi, and down to the shores of the Pacific—has carried us from the lake region over the great plains to the Rio Grande, and must soon land us at the Isthmus, in full possession of all the territory to that point, whether we remain one people or half a dozen, for that is our destiny. What the Anglo-Saxon race north of us do not take of this continent, we of the United States do. It is our natural Anglo-Saxon love for land—"earth-hunger," as Emerson terms it, that makes us the colonizing, civilizing, controlling and dominating race of the West, as Russia is of the East, and that to-day gives us—the Anglo-Saxons—the same position on the globe that the Romans held two thousand years ago.

Thus far I have treated of the influence of agriculture on man as a physical being, and in his material surroundings—upon man in his animal life, on his civilization, and his associations which require commerce, manufactures, laws, nationalities. Now for a few moments I will ask your attention to the relations of agriculture to science, and to what pertains to man's mental organization.

I said of the influence of agriculture upon man's material nature, that man was composed of the earth, of the air, of the water, of what surrounded him, of what he received into his system and assimilated with his being. Mentally it is the same. What is the food of the mind—its atmosphere, its earth, and its heaven—give character, bias, direction. As compared with town life, every thing in the country is favorable to strength and vigor of intellect. First is health, second employment, and third, the natural and social surroundings. The town may give quicker growth, for it is the hot-bed culture; and it may give more activity and intensity; but it will lack breadth and depth of character. No more will man come up to his fulness of stature and strength between brick walls and under the shadow of high buildings in narrow streets, fed on dry-goods boxes, stiffened with yard-sticks, and bound around with tape, than will a tree in a gravelly road, where the sun seldom shines upon it.

The place where one lives is not without its effect. A flat country produces flat heads, and a high, mountainous country, with the free winds upon it, produces lofty and free minds. Society has something to do with the character also; and the industrious and virtuous example of the farmer and his wife upon the son, is very unlike the influence of the streets of the city. Solitude, likewise, has much to do with character. In the city, life is a rush; to the youth it is the morning paper, the school, the noon telegrams, the school again, and the evening paper. There is no cessation; events crowd, and there is little thought. Life is borrowed; it is artificial; and therefore weak. In the country there is less schooling—thank God for that—and more study; less reading and more reflection—more digestion of what is heard, seen or read, and more appropriation to the life. The sermon of Sunday is food for thought in the field, and in the woods, and in the barn. The newspaper is read to be discussed, and not thrown down to take up another, and another, till the mind, like the drunkard's appetite, is so vitiated that we must have the details of a half-dozen battles a day, and delirium intervenes if the telegraph wire breaks for an hour.

Now mark the results: the majority of great minds from the beginning of time have come from rural life. As an illustration: this Republic has never had a President who was not born in the country and brought up on a farm. So it is in every department of business, and in every calling and occupation. The surplus of population — and I am afraid, more than that — flows from the farm to the city. The boy goes pennyless and unknown, and for a time he may scarcely hold his way with his town associates; for it takes him longer to grow, because he has longer to live, and there is more of him; but, after a time, inquire whence come the men who are master mechanics, leading manufacturers, rich merchants, who fill the professions and find brains at court houses, State houses, and colleges, and they will tell you of the young men from the hard hills, where their fathers gained a livelihood by hoeing away the rocks, and sent their sons to the town with cowhide shoes, homespun apparel, and their little all of property—a change of clothing, and the

Bible that mother gave them—wrapped up in a cotton handkerchief.

Thus from the farms, and most of them from poverty, have come up your Webster, Cass, Choate, Douglas, Benton, Calhoun, Silas Wright and Henry Clay—the men who gave dignity to the Senate chamber, and exhibited grace and eloquence, and learning before courts and peoples. Thus from the farms have come the philosophers, and poets and scholars, who have left names to live; thus the warriors who have fought our battles and written history in blood; thus, the merchants who have built cities, covered rivers and lakes with steamers, and sent their ships to every sea; thus, in fine, the men who have given character and tone to the nation.

The farmers are necessarily the thinking and studying men, for their business involves and demands a greater variety of knowledge, scientific and practical, than any other occupation in which man can engage. Many of the sciences were born on the farm, actually called into existence by the necessity of the husbandman, and their origin was coeval with the first turning of the sod. Astronomy and meteorology, the most ancient and the most useful of sciences, were studied by the shepherds and farmers before Abraham fed his flocks on the plains of Mamre; before Lot, separating from his kinsman, pitched his tent towards Jordan; before Joseph was sold into Egypt, or Moses led the fugitive slaves, 3,000,000 strong, through the Red Sea. They were the study of the Chaldeans, Egyptians, Indians, and Chinese—all agricultural peoples from the remotest antiquity.

A knowledge of the times and seasons, of the rise and fall of the rivers, of the ebb and flow of the tides, of the early and latter rains, of the cycle of the periodical storms, of the formation of the earth and heavens, of the influence of various winds, of the foretelling of the weather by signs in the skies, of the snows, the frosts and the dews—these were all subjects of the closest observation as having an intimate bearing on the labors of the husbandman. The researches of those early nations were carried to an extent that would astonish such as imagine that wisdom is altogether modern.

The science of mechanics was first called into existence as the handmaid of agriculture. The first wheel and axle was used by the farmers of Egypt to raise the waters of the Nile for irrigation. Botany, another name for horticulture, is only a branch of agriculture—valuable as it acquaints us with the structure and habits of various plants, and aids in determining what soils to select, and what modes of treatment will be crowned with the most certain success. It has been a study ever since Eve gathered bouquets in Eden. Natural history or zoölogy, which describes the various classes of animals, and tells how they can be made serviceable to man, and how they can be improved, was familiar to Jacob, when he met Rachel by the well of Haran, watering her father's sheep, and before he served Laban for the speckled and spotted cattle. These, and other branches of knowledge, are the products of agriculture.

But geology, mineralogy and chemistry are the trio of sciences, which at the present day are so intimately connected with agriculture that the latter may almost be considered a fourth science of the same family. Though it can hardly be claimed that they owe their origin to agriculture, yet it is certainly true that the demands it has made upon them have been the strongest incentives to their own progress. Their professors have been spurred on to further investigations and new discoveries, in order that they might be fitted to answer the riddles propounded from the farm. The labors of Liebig, Johnston, Miller, Horsford, Hitchcock, and the whole galaxy of scientific lights in the last quarter of a century, have been directed to the elucidation of the great principles that underlie agriculture, and the results of their investigations are as essential to the farmer who would conduct his business understandingly and successfully, as the plough itself.

The farmer of to-day must not only be able to plough his land, but as he does so he must be able to judge of its character, its wants, its susceptibilities. Without waiting a half-dozen years in experimenting, he must be able to decide whether or not it is deficient in some one or more principles which, if added, will adapt it to a given crop. Of the various fertilizers brought to his notice, he must be able to say whether any of them are preferable, in cheapness and effectiveness, to the accumulations of his own barnyard, and which of them possesses the very elements required by his own soil. All the conditions, relations and effects of soils, manures, crops, etc., must be understood by him, as the laws that govern and influence navigation are to the mariner; and it would be as wise in the latter to go to sea without compass or quadrant, chronometer or charts, designing to feel his way — to make his voyage practically instead of trusting to "book learning," as it is for the farmer to go to his business without preparation in knowing the great principles that have governed the world since the new lands first appeared above the waters and gave birth to the grasses, because he will not accept "book farming." To be sure, after all, success must depend on practice; and so it must in law and physic, in divinity and mechanics; but shall we therefore have no schools of instruction in those branches?

What is practice but the application of the principles laid down in the books to the details of a business? The New England farmer stands in the same relation to his exhausted lands that the physician does to his patient, restoring vitality, regulating food and directing employment. We have scientific physicians and quack doctors; and we have scientific farmers, and quack farmers. It sometimes happens that the sagacious quack is superior to the theoretrical physician; but it is no wiser to go into farming without knowledge than it is to expect to be successful in medicine without study. But there is no danger that our young farmers will neglect the acquisition of agricultural knowledge. It is not in the New England mind to see an effect and not inquire into the cause. Our natures revolt at becoming machines, and all employment is without pleasure where we do not understand the operations of the laws that govern it. With that knowledge there is a world of delight in nature. Every stone, and every bone, and every field and every tree has its story; every flower, every plant, every bird, every animal has its history! and all nature opens to the eye new beauties, as do the heavens to the astronomer. It is to the intelligent farmer that there are "books in the running brooks, sermons in stones, and good in every thing."

AGRICULTURE, AS A NATIONAL INDUSTRY:

THE RELATIONS WHICH IT ESTABLISHES BETWEEN NATIONS, BETWEEN STATES, BETWEEN VARIOUS PEOPLES.

From an Address before the Middlesex Agricultural Society.

BY GEORGE B. LORING.

I deal with a material question. I know no other at this time. I do not believe that a free and enlightened people can be debauched by excessive wealth into heartlessness, or insensibility, or dishonor. But I do believe that upon the prosperity of a community depends the tone of its morals; and I know that upon successful industry our institutions of learning and religion depend for their most valuable support. I have great faith in a thriving people; I have none in a bankrupt, unfortunate and poverty-stricken people. I speak of universal prosperity—a diffused wealth—where every man has an interest and an opportunity. For, upon this foundation alone, can a free people, clothed with all the responsibilities which belong to self-government, and divided into towns and counties and states, build a sound and substantial political fabric, and arrive at true wealth and power. Individuals in a state may be rich and yet the state itself may be poor—poor in finance, poor in industry, poor in cultivation, abjectly poor in every element of social and civil elevation. True, the class of monopolists may be so great and powerful, and their business be so extensive, that every subordinate order of society is kept in constant, profitable activity. But a people thus organized cannot be free. They may control the commerce of the world; they may manufacture for all mankind; they may establish the rates of exchange throughout every market; but one-half of such a people must be "hewers of wood and drawers of water" for the other. The political economy, then, which belongs especially to Massachusetts, requires such a distribution of wealth, as will secure equal elevation, equal taxation, social equality, mutual dependence, universal prosperity. It is this political economy which has made Massachusetts what she is; and which, if developed still further, would have cultivated her lands with the same assiduity and success with which she has built her mills and her ships. It is on this account that she is so especially dependent upon other states, and illustrates, with great force, that relation which is established by agriculture between the various nations of the earth. It is on this account, that her interests appeal to the most enlightened and liberal wisdom of her statesmen, demanding of her to sustain that policy which shall enlarge our national power, develop all our resources, and secure to ourselves a high and commanding position. Rousseau, in obedience to the maddest and most destructive philosophy, unmindful of the true origin and purpose of all social organization, and with atheistic defiance of the laws written by the Great Author of all things, upon the work of His hands, declared that "he who laid the first foundation of property, was guilty of treason against humanity, and deserved the curses of mankind." May we not, by pursuing our avocations with wisdom and justice, and increasing our liberality as our intimacy with other states and nations increases, prove to the world that humanity, enlightenment and wealth may go hand in hand, even though moralists and publicists have taught that wealth caused the fall of the great empires of antiquity, unmindful, as they have been, of the destructive effects of the social distinctions and military despotism, which lay at the foundation of these empires.

While manufactures and commerce make rivals of nations and states, it is agriculture which may establish the most intimate relations between them, and create the firmest alliances. How much internal commotion has arisen from the adoption of systems of tariff, based, not on revenue, but on protection for manufactures! What strifes have preceded the possession of a market for the products of an industrious people! What wars have been waged for the benefit of commerce! And, in the midst of all these convulsions, how has the earth brought forth her fruit, without competition, without conflict, and furnished opportunities for agricultural enterprise—not for rivalry, but that every cultivated spot might furnish its proportion of the great and various material from which man finds food and raiment—wheat from the Black Sea, and wheat from Illinois; cotton from India, and cotton from Georgia; hemp from Russia, and hemp from Kentucky—for a common purpose.

Turn your eyes to that great empire which occupies all Eastern Europe and Northern Asia, and whose commerce and manufactures are not large, but whose semi-barbarous agriculture gives her strength at home, and power of defence, at the same time that it establishes her importance to more active and civilized nations, and maintains with them her peaceful relations. Russia gives small cause for war. She is the ally of nations whose productions are smaller, and whose manufactures are larger. Her soil is fertile—consisting of a soft, black mould, of great depth, and generally on a sandy bottom. Her climate is not propitious—the seasons being short, and often attended with violent summer rains, boisterous winds, and continual autumn fogs. Her social condition is by no means calculated to secure universal prosperity, or industry and activity. Landed property there is almost everywhere in large tracts, and is either the property of the Emperor, the religious and civil corporations, or the nobles. There are a few free natives, who have purchased their liberties, and some foreigners, especially Germans, who have landed estates, but these are comparatively of no account. In the Ukraine, within the last thirty years, have been introduced, on the government estates, a number of foreigners, from most countries of Europe, who may be considered as proprietors. These occupy the lands on leases of a hundred years or upwards, at little or no rent, on condition of peopling and cultivating them, and residing there. In the country part of Russia, there is no middle class between the nobles, including the priests, and the slaves. Estates are, therefore, either cultivated directly by the proprietors, acting as their own stewards—indirectly, by letting them to agents or factors, as in Poland and Ireland—or by dividing them in small portions among the peasantry. In general, the proprietor is his own agent and farmer, for a great part of his estate; and the rest he lets to his slaves at certain rates of labor, corn, personal services, and sometimes a little money. These slaves, it is to be observed, are as much his property as the soil, and in seasons of scarcity, or in the event of any disaster, the lord is bound to provide for them, and, indeed, deeply interested in doing so, in order, at least, to maintain the population, and, if possible, to obtain a surplus for sale, or for letting out to the town. As in Poland, the lands are everywhere uninclosed.

The farm buildings are almost everywhere constructed of timber—the stove and its chimney being the only part built of brick, or of mud and stones. The noblemen generally reside on their estates, and their houses are surrounded by the village which contains their peasants. These villages are in general dull and miserable assemblages of log-houses, all of one size and shape, with but few of the conveniences of civilization.

The agricultural implements are the most simple that can be imagined; and their cultivation of the earth is remarkable chiefly for its aboriginal rudeness.

While the Russian peasant turns his hand to almost any thing—ploughing, weaving, building, &c.—the serfdom of the population is wholly incompatible with industrial and commercial enterprise. Her internal trade is immense; but her foreign commerce is maintained chiefly by the export of tallow, wheat, wax, hemp and flax, potash, tar and cordage—of all, hemp most extensively—and all, the productions of her soil.

To Russia, the commercial and manufacturing nations of the earth owe their supply of a large portion of the materials referred to. With all her social wretchedness, and all the rudeness of her operations, she extends her hand, filled with all that is most needed by a higher civilization in its active enterprises. Through her agriculture, poor as it is, she maintains her position, and becomes the ally of nations having less land and larger accumulations of wealth.

So, too, of India. Here, agriculture is carried on with but little industry and with no science. The condition of the people is as poor as possible. The landed property in Hindostan is held, as it is in all the countries of Asia, to be the absolute right of the king. The Hindoo laws declare the king to be the lord and proprietor of the soil. All proprietors, therefore, pay a quit rent, or military services to the king, or rajah, excepting some few, to whom, it would appear, absolute grants were made. In general, the tenure was military; but some lands were appropriated to the church and to charitable purposes, and, in many places, commons are attached to the villages, as in Europe. Lands in Hindostan, and in Bengal most especially, are very much divided and cultivated in small portions by the ryots, or peasants, who pay rent to subordinate proprietors, who hold of others, who hold of the rajah. The actual cultivators have hardly any secure basis; they are allowed a certain portion of the crop for the maintenance of their families and their cattle; but they are not intrusted with the seed, which is furnished by the proprietor, or a superior holder. The ryot, or cultivator, is universally poor; his house, clothing, and implements of every kind, do not amount to the value of a pound sterling; and he is considered as a sort of appendage to the land, and sold along with it, like his cattle. So little attention is paid to any agreement made with him, that, in good seasons, Dr. Tennant informs us, the zemindar, or superior holder, raises his demands to a fourth more than the rent agreed on. Custom has rendered this evil so common, that the miserable ryot has no more idea of obtaining redress from it than from the ravages of the elements. Since Bengal was conquered by the British, the government is, properly speaking, the proprietor of all the lands; and Tennant accordingly observes, that "nine tenths of all the rent of Bengal and the provinces constitute the revenue of the company, who are, in the room of the Mogul Emperor, the true proprietors of the soil."

The productions of this country, besides those immediately consumed by the inhabitants, are sugar, cotton, hemp, indigo and jute; and they are all raised by the most primitive modes of agriculture. The population is exceedingly dense; and a large proportion of the products of the soil, which are necessary for food and clothing, is consumed by the inhabitants. The surplus of rice, sugar, and cotton raised in India is not large, and consequently these articles do not enter very extensively into her exports — the home consumption being large, and the labor by which they are produced being devoid of system and intelligence. And yet India, as a purely agricultural nation, notwithstanding the defects in her social organization, notwithstanding her want of all modern improvements, furnishes a large amount of wealth to the commerce of the world, and in her political relations to Great Britain, forms almost the right arm of the power of that rich and prosperous kingdom. It is not India, a manufacturing and commercial people, that is valuable to England, but agricultural India which has filled her coffers, and employed her ships, and consumed her manufactured goods, and furnished employment for her surplus soldiers, and her ambitious nobility.

The importance of the West India Islands, in all their divided political relations, arises from the fact that they abound in the most important agricultural productions. Cuba, as a Spanish possession, may almost be said to save Spain from bankruptcy, so large is the tribute which that island pays, in every variety of way, based upon her agricultural resources.

It was an agricultural rivalry between the British West India Islands and Brazil, in which the latter, by her superior markets and cheaper productions, offered irresistible temptations to the manufactures and commerce of England, which, at last, settled the question of emancipation there. In 1820, a large trade sprang up between England and Brazil, which, owing to a Brazilian tariff in favor of English manufactures over those of all other countries, had reached the amount of £5,000,000. At the same time, the importation of the produce of Brazil into British ports was prohibited, in order that the West India Colonies might find a market there for their coffee and sugar. This state of things became at last intolerable; and one advocate of emancipation tells us, that "there is no doubt whatever that the West India Colonies have been a sad burden to this country, (England) and, what is not very consolatory, they are very likely to continue so. A vast capital is invested in these islands, and must not be too hastily interfered with; but, at the same time, the legislature is bound to encourage the trade with the States of South America, for they are decidedly our best customers, and, if properly managed, promise to take from us, at no distant day, more manufactures than we now export to all the rest of the world besides. The blacks and the planters are sufficiently burdensome, without permitting them to shut out all competition, to curtail our commerce, and limit the employment of our shipping. The Brazilians take from us now all the manufactures they are able to pay for; but, if we took their sugar and coffee in return, they would of course, be enabled to take from us a much larger quantity."

Lord Stanley, the great advocate of emancipation, in Parliament, in his speech, May 14, 1833, also referred to this same fact, and complained that the West India planters, by the monopoly which they enjoyed, were constantly glutting the English market with their sugar, and embarrassing the trade of the country. And he appealed to the house to know whether "they would encourage and support a system by which this extent and amount of production was kept up."

In a struggle for supremacy in the markets of England, the agriculture of Brazil overcame the agriculture of Jamaica — and the consequences you all know.

A striking illustration of this point may be found in the sad and astounding events which are passing immediately before us. Less than two years ago, the commercial relations existing between ourselves and Great Britain, had involved an amount of property almost beyond estimate. On our part, we offered the most diversified and extended agriculture; and on her part, she presented the products of as large, and skilful, and industrious a class of manufacturers as the world has ever known. The surplus products of our north-western prairies, of the rich valleys of the Ohio and Kentucky, of southern savannahs, of the plains of the south-west, furnished us with the means of securing the balance of trade, and gave to England support for the thronging population of her towns and cities. With entire confidence, the farmer of Illinois put in his hundreds of acres of wheat, for he knew the market that required and could pay for all that was not used by consumers nearer home. The southern planter enlarged his cotton-fields, aware that millions of busy spindles were waiting across the Atlantic, to receive what was not woven upon the looms of the North. The peaceful influences of trade were felt throughout the world, as long as this interchange continued between the United States and England, the two most powerful, controlling forces among nations. For ourselves, what a power it gave us. No foreign threats alarmed, no foreign diplomacy bewildered a nation, whose vigor and strength, whose enterprise and industry, gave all the force of armies and navies to its simple declarations. Without interference we pushed our way into Mexico and occupied the Pacific coast, with a rich, and thriving, and free state — one of the brightest stars in our constellation. Our citizens demanded a highway across the Isthmus, and reluctant nations withdrew from all proposed attempts at resistence. Whatever may have been our ideas of the gentle influences of a superior and Christian civilization to prevent a resort to arms between England and ourselves, daily passing events must now teach us that it was the important and intricate industry of a people almost unarmed, which proved itself more powerful for peace and respectful consideration, than all warlike menaces, and all military organizations. The export of 27,000,000 bushels of wheat, 5,000,000 bushels of corn, 644,000,000 pounds of cotton, most of it to England, did more than millions of arms, and tons of powder, and labyrinths of diplomacy, and all the eloquence of peace societies, to preserve our amicable relations with that power. For our cotton found, on the score of quality and cheapness, no competitor, and our grain had at last became a necessity. For, " though Western Europe has been supplied, to a large extent, from Russia and other parts of the world, it is becoming more and more evident, that it has got to look more and more to this country for its supplies," and this fact is recognized by many of the leading journals and statesmen of Europe, as, for instance, the " Mark Lane Gazette," which says: " One fact is clear, that it is to Western America that we must, in future, look for the largest amount of cereal produce."

Less than two years ago, all this pacificatory, and Christianizing, and humanizing, and civilizing intercourse was going on: while the merchant in his counting-room, the clergyman in his pulpit, the statesman in his halls, the laborer in his field, the mechanic in his shop, each looked upon England as his ally and friend; and the philanthropist, so called, dreamed that this material bond of union was an etherial sentiment, an abstract principle, a mutual devotion to some scheme of human perfectibility, more influential than food and raiment and wealth and commerce, and the happiness and joy which attend prosperity and peace. Now how changed. The markets of England are closed. Exchange has found a heavy balance against us. The plantation finds no outlet. The crops of the West will not pay for cultivation. The just now busy and happy crowds which throng the manufacturing towns of England and France, are wretched and squalid in idleness and poverty and starvation. The great channels of trade are turned from their course, or dried up. The kind feeling which existed between ourselves and England, and which manifested itself in constant courtesy, and repeated tokens of respect, is gone. Even the bonds which united the countrymen of Lafayette and Washington into one fraternity, are snapped asunder. The relations established by an interchange of products are gone. And it behooves every statesman, every true philanthropist, every citizen, to pause and consider how these relations can be restored, and fixed on a firm foundation. Not by anarchy, not by disruption, not by dissolution and division, and the downfall of that civil system which has given us all our prosperity at home, and our power and usefulness abroad; not by subjecting the agricultural and producing interests of this country, to the depressing influences of jarring and discordant states, or petty republics, can the distractions of business be healed. Not by encouraging attempts to break up our government, can England expect to return with us to our former commercial relations. Not by inviting national bankruptcy for us, can she hope to increase her own wealth. Not by a system of depopulation and ruin can we raise ourselves out of the manifold difficulties into which we have plunged; but by devotion to our government, by a determined and resolute struggle for its existence, by the preservation of every industry through all this fiery trial, by a jealous regard for the rights of all who have sought protection and found it under the flag of our Union. I cannot contemplate without distress and shame, that desolation and exhaustion which would make us the helpless prey of an unscruplous foreign power, and would expose us to the effects of ignorance and crime at home. May my eyes be spared the sad and sickening spectacle of a people who, unmindful of the boundless blessings and the purifying influences of peaceful industry, under a free government, bowed themselves in blind rage between the pillars of their holy temple, and perished miserably in the ruins. Have you churches here? They demand the restoration of the government for their protection. Have you schools? They must languish under the baneful influences of a distracted and impoverished republic. These farms—these New England villages—these mills, now silent—those ships, with their white wings glancing in every sun—all wait imploringly for the recognized supremacy of the Constitution, and for the protection of every industry under a victorious flag. If we have any faith in the God of our fathers, let us labor for this.

If we have any love for our children, and for those who, coming after them, shall possess and transmit our genius and our blood, let us give them this goodly land and large, with a restored prosperity, and with the lessons of wisdom which our experience may teach them. And as they survey the trials which will surround them, may they have learned from the sorrows which oppress us, that, not as enemies and aliens, but as brethren of one family, they are to join hands, as did our fathers, for the elevation of mankind, and the promotion of prosperity under a government which is based on equal protection to all, and which relies upon popular intelligence for the removal of those evils, which an arrogant and self-righteous dictation can only magnify and confirm, or remove by sweeping desolation and ruin. Is there a man among us who would not gladly lay down his life, if, by so doing, he could restore his country to her former glories—to the hour when, animated by the largest wisdom and love for mankind, our fathers adopted the Constitution—to the hour when an united people drove the invader from our land, and planted our flag on the high seas, and gave us the names of Lundy's Lane and New Orleans, of Miller and Jackson, of Decatur and Brainbridge, and Perry and Macomb—to the hour when for us Scott and Taylor won their renown on the fields of Mexico—to the hour when the heroic declaration—"The Union must and shall be preserved," thrilled the whole land, and treason shrank before an indignant people—to the hour when our industry was felt in every market of the world, and the success of our institutions filled with hope and courage the hearts of all who were laboring to be free, and our country was the refuge for the oppressed and starving victims of despotism and wrong? Is there a man among us who would not gladly lay down his life, if by so doing he could restore that Union which has made Massachusetts what she is?

I say, has made Massachusetts what she is. For, as we look around and survey the origin and extent of our prosperity, do we not find that, from our own State to every part of our Union, we have stretched forth our hands to fill them with plenty? From the great valleys of the West, we have brought by cheap and easy conveyance, the food which we were too busy to gather from our own neglected acres. From the luxuriance of the perennial South, we have drawn that delicate fibre which lies at the foundation of our massive mills, and has brought into existence our great inland cities, and bound our rapid streams into most useful service for man. Not a coal mine but has lent us its aid. Not a mountain pasture but has fed its flocks for us. Not a vein of ore but has submitted its treasures to the hands of our skilful artisans. Not a forest but has sent its sturdiest and stateliest growth to be moulded into that fleet, which, with unceasing toil, bears the wealth of every clime to our commercial metropolis. Upon every agricultural district of our country we have drawn for our supplies; and to every agricultural district of our country we have looked for our markets. By our untiring industry and skill we have made markets for the productions of all latitudes; and by a reciprocal operation, our manufactures have found purchasers everywhere. We have received corn, and wool, and iron, and hides, and cotton; we have sent forth cloths, and shoes, and implements of husbandry, and almost every machine which the ingenuity of man can devise, or the wants of man require. We have prospered upon the great system of internal free trade, which forms an important part of the splendid civil polity, so full of mutual benefit and mutual obligation.

I need not remind you what Masachusetts has become under the influence of this policy. What a school system has she organized and endowed through the liberality and wisdom of her legislature! What colleges has she built, through the munificence of her wealthy capitalists! What cities has she erected, through her untiring and varied industry!—Boston, and its rich and beautiful suburbs; Worcester, Springfield, Lowell, Lawrence, Salem—and towns innumerable, increasing in wealth and intelligence, and all the arts of civilized life, and presenting an accumulation of active business, and of education and refinement, unequalled by any like portion of territory in America—perhaps not in the Old World. How large, then, should be her patriotism—how broad her charity—how comprehensive her statesmanship—how wide-spread her influence for all that may give power to the American name. If there is a State which should be true to the doctrine of self-government, it is our own; for she has reached her eminence by the exercise of this prerogative which the Constitution confers upon her—or rather, which she reserved to herself when she joined the confederation. If there is a State which should recognize the full force of that immortal principle of free government, that "government derives its authority from the consent of the governed," it is our own; for she has reaped a large reward from association with her sister States, which clustered round the flag for the secure enjoyment of this blessed privilege. And if there is a State which should rally for the support of the government and the defence of the Union, it is our own, loaded as she is with the blessings which the Union bestows, interwoven as her industry is with every section of our country, and responsible as she is to the thousands of her sons who are pouring out their blood like water for our existence as a nation, and whose success in this great design can alone avert the distress and disruption and bankruptcy and poverty which must attend their defeat and failure.

My friends, we are here to-day as citizens of Massachusetts, to consider the interests of one great branch of industry in our Commonwealth. What I say for her, I say for all the States with which she is associated. The war in which we are engaged involves the success, the very existence, of all. The burden which we carry, presses on all alike. The result, if we conduct ourselves as men and patriots, must bring equal relief to all. If the victory which we are to achieve is to be a source of blessing to us, if it is to be any thing more than a barren sceptre in our hands, it must bring with it the re-establishment of whatever has elevated and sustained the laboring classes of the North. It must come before our population is decimated, and before the vigor and strength of our young men is lost to our farms and our mills. Already, more than eighty thousand men have been withdrawn from the industry of this State alone. They are the bone and muscle of our great producing community. Can we continue this, and our business not languish? It must come before we are involved in a monstrous national debt, which will render labor wholly subservient to the interests and necessities of capitalists, who are compelled by the burdens of taxation to extort from labor all they can get at the cheapest rate; and which will combine capital against labor, instead of rendering it dependent upon a most liberal system of labor for all its profits. It is the poor man, whether he be the owner of a small farm, or a laborer in the fields of another, or an operator in a mill, who must feel the burden of a national debt, and for whom I plead, when I urge a manly struggle and a speedy restoration. It must come before the appalling alternative of dissolution and discordant republics stares us in the face, with all its conflict of industry, its rivalries, its loss to us of all the future acquisitions of our republic, its establishment of that fatal foe to freedom, a standing army, against which all the eloquence of the patriots of the Revolution was poured forth, when Warren, and Hancock, and Hichborn, and Thacher and Austin appealed to the American people to strike for their freedom, knowing, as they did, that it was the nature of military government to concentrate wealth in a privileged class, and to impoverish and enslave all others. It must come before our freedom is lost forever. And when it comes, may it confirm those relations to which I have referred, as based upon the productions of different sections of our country, and as the source of our material prosperity and our religious, moral, and civil elevation.

In the address which I had the honor of delivering last year, I considered the advantages which the agriculture of Massachusetts might derive from her extensive manufactures. I have now directed your attention to the prosperity which may attend every branch of her industry, by her intimate connection with all the great producing sections of our country. It would be well for us to remember, that, wherever large domestic or foreign commerce has been carried on, based upon the interchange of the various products of labor, especially of labor on the land, wealth, with its accompanying national blessings, has accumulated most rapidly. Trading in the agricultural products of other states, gives wealth; a close alliance with those states alone gives stability to any government. For more than eight hundred years, the Phœnicians amassed wealth in their famous cities, Tyre and Sidon, by commerce alone; and when they surrendered to the remorseless avarice of the great conquerors of the East, their wealth fled to other ports; they had neither large agricultural dependencies, nor were they members of a republic rich in agricultural resources. The Greek and

Ionian cities, Alexandria, Marseilles and Carthage, passed through the same history. And Rome fell, because, after having conquered the world, she plundered all nations, and used her wealth and power, not for fertilizing lands, or improving any kind of industry, or extending the bounds of civilization; but for the purchasing of luxuries for the appeasing of the seditions of the cohorts, and for the satisfaction of her insatiable avidity.

Venice, Genoa, Pisa and Florence, though doomed to poverty by the barrenness or smallness of their territory, acquired yet great wealth by their commerce with the agricultural regions of the East and North. Not less powerful than Tyre, Sidon and Carthage, they dictated laws to the Greek Empire, bade defiance to the greatest monarchs, and balanced, for more than three centuries, the fate of Europe. Their grandeur declined with their wealth, which they imprudently sacrificed to expensive wars, to a fatal rivalship and an unbounded ambition; it vanquished forever when unforeseen events turned aside the current of their trade, and reduced them to the resources of their own territorial riches and local industry.

Before their fall, they had established numerous marts and factories in the north of Europe, at Lubec, Bremen, Hamburg, Bruges and Antwerp, which created for them new sources of wealth and prosperity. Towns, hardly known before the introduction of foreign commerce, were soon distinguished for their wealth, splendor and power. Wiser than the cities of Italy, they guarded against the dangers of rivalry, formed a confederacy for the protection and defence of their trade, and laid the foundations of the Hanseatic league, that monument of boldness and prudence, in a barbarous age and among a rude people — an example which the founders of our republic followed in their age of enlightenment and Christian intelligence. This example Great Britian has not forgotten, in her tenacious hold of her colonial possessions, the fruit of her long and vigorous wars, held either by treaty or by a compulsory bond, and uniting London and Liverpool, and Calcutta and Canton and Bombay by golden chains. This example may Massachusetts and New York, and Philadelphia and Baltimore long remember.

My friends, we are a part of that community who hold in their hands the farms of Massachusetts, a portion of her wealth and industry, which, in an hour like this, demands all our care.

Amidst the complicated trials of civil war, our commerce may fail, our mills may crumble, our banks may be crushed ; but our lands must remain, the imperishable property of a frugal and industrious people. As our fathers left their plough in the furrow, to fight two long and distressing wars for independence and national honor, and returned to them when the angel of peace again hovered over the land, finding in the cultivation of these hills and valleys an ample reward for their toil, and exercising, through the merit of their calling, those manly virtues which they transmitted to us, so may we, the farmers of Massachusetts, having done all that in us lies to save our country, preserve and enlarge, and develop for her that industry which may be her support in war and her reliance in peace.

My fellow-citizens, I have discussed our national affairs before you, not because I believe it necessary to give you new light, or new wisdom for the hour, but because I believe that, like the Christians of old, we are of "one mind and one heart;" and that for our country we have all things in common.

I have spoken, not as a member of any sect or party, but as an American citizen, believing in American institutions, jealous of American honor. I might have chosen other topics, but with your hearts and my own "in the Highlands," all things else seem idle, frivolous, unimportant. For, what is our art, what our science, what our literature, what our various pursuits, if we are to fall before those trials which now beset us on every hand? All occupations, all interests, all men bow before that one question : how shall we save our country? And when the history of these times shall be written, it will be found that its brightest pages are reserved for those who, unmindful of all differences, superior to all temptations, pledged their lives, their fortunes, and their sacred honor, for the preservation of the constitutional freedom, and that empire of equality, which our fathers founded in their wisdom and sanctified by their blood.

THE PRODUCTIVENESS OF THE EARTH.

From an Address before the Worcester North Agricultural Society.

BY A. N. ARNOLD.

We may introduce the subject by considering, first, the earth's productiveness as limited by the extent of its land surface. Of the 200,000,000 square miles which make up the surface of this terraqueous globe, about three-fourths are covered with water, leaving only about 50,000,000 square miles, or 23,000,000,000 acres of land. We might wonder that so large a proportion of the earth's surface should be covered with water, and be tempted to adopt the suggestion of an old writer, (I think it is Sir Thomas Browne,) that "God loves *fishes* better than *men*," if we did not know that this vast watery expanse not only contributes to the fertility of the continents, but is absolutely necessary to their capacity for great productiveness. So great an evaporating surface is indispensable to furnish the material for watering the whole face of the ground. The boundaries of sea and land are fixed by the wisdom of the Creator, and perpetuated by the natural laws which he has established, so that we may not expect any considerable change in the relative proportions of these two essentially different components of the exterior of the globe which we inhabit.

We know that on certain coasts, the sea has long been encroaching on the land, and that on certain others, the land has been crowding the water back: but these two opposite movements probably nearly balance each other, or, if they do not, they are so slow and limited in their action, that they do not materially affect the productiveness of the earth. The proportions of land and water over the whole globe are probably not now different, by any appreciable quantity, from what they were when Noah died. Human industry may do something, as in Holland, to scoop out a country from the ocean, and it may accomplish still more by draining lakes and marshes; but after all, it is not probable that any very considerable addition will ever be made by man to the producing surface out of which the growths that support human life must come. How far human industry, ingenuity and science may avail in reclaiming the naturally sterile regions of the earth, it may not be easy or safe to affirm. Utter sterility, such as that of the great sandy plains of Asia and Africa, is probably incurable by any means that will ever be in the power of man. If we could first make the rain descend, where there is no roughness or variety of surface, and no vegetation, to disturb the equilibrium of the atmosphere, and none of the geographical conditions on which showers depend, vegetation would doubtless gradually encroach upon the arid waste. Or if we could first produce vegetation where there is no rain to water the parched ground, then the fertilizing showers would, no doubt, by an atmospheric law, in due time descend.

But since we can command neither of these, we may as well regard those great deserts of the eastern continent as irretrievably doomed to perpetual unproductiveness. The great belt of barren sand which stretches across the northern part of Africa, and the centre of Asia, comprises about 6,500,000 square miles. Adding to this the aggregate of smaller tracts of land equally, or almost equally sterile, we have a total of about one-seventh of land surface of the globe which cannot be made to yield any tribute to human life or human luxury. The proportion is remarkable. As one-seventh of time is morally excepted from the term of human labor, so one-seventh of the ground is naturally excepted from the field of human industry, enjoying a grand and solemn Sabbath stillness.

A second aspect in which the productive power of the earth may be considered, is with reference to improved modes of cultivation. It is impossible to fix a limit to the extent to which science and labor may increase the products of the soil. We see a vast difference in this respect between different countries equally favored by nature. Thus, in the Austrian Empire, there is more land under cultivation than in the British Isles, and this land is not of inferior quality, yet the production is one-third less; and this difference is mainly owing to the superior intelligence and more skilful cultivation of the Britons. Great expectations were entertained by theorists a few years ago, in regard to the results of the application of chemistry to agriculture; but I believe the diversity of ingredients in the soil, in different parts of the same field, presents an insurmountable difficulty in the way of the successful analysis of soils.

But although science may not have succeeded, in this particular instance, in effecting any great addition to the productiveness of the ground, yet there can be no doubt that it will be found true in this matter, as in others, that "knowledge is *power;*" and it is therefore reasonable to look for a vast increase in the productiveness of land in all countries where civilization and intelligence prevail. It is only by gradual steps, as knowledge has increased and prejudice has been overcome, that the present amount of productiveness has been attained; yet the advancement, though gradual, has been wonderfully great. In the eleventh century, the average yield of wheat was not more than six bushels to the acre. It has fully trebled since that time, has it not? And to go back only half a century, the productive power of Great Britain, in the article of wheat alone, increased from 1801 to 1851, to an extent sufficient to support an additional population of seven millions; and this increase was mainly owing to improved cultivation.

The productiveness of the soil may be considered again, as affected by its division into small or large estates. Whether the greatest amount of natural products and of national prosperity can be obtained by having few owners and large estates, or by having many proprietors and small farms, is a question about which writers on political and social science are not agreed. Where the owners are few, and the estates large, the accumulation of capital gives greater facilities for introducing all improvements in the mode of cultivation, and so favors the highest degree of productiveness. But, on the other hand, where the landholders are many and the farms small, more land will be brought under cultivation, and so the aggregate production may be greater than where a smaller portion of the soil is tilled in the most approved methods, and brought to the highest degree of fruitfulness. The question will be likely to be decided by each one according to his preference of an aristocratic or democratic condition of society. Large estates tend to great social inequality.

Landed proprietors are regarded as the superior class—the only true *citizens;* and the condition of the actual laborers on the soil, if not that of slavery or serfdom, tends strongly in that direction. Multiply the number of proprietors of the soil, and you secure more intelligence and independence in those who cultivate it—a hardy, virtuous, freedom-loving yeomanry, such as constitute the best citizens of a free State. In England the number of proprietors is less, compared with the extent of land, than in any other country of Europe; and England is the most aristocratic country in the world. With an accumulation of wealth never equalled in the history of the world, about one-tenth of its entire population are paupers—that is, they receive eleemosynary aid from the public purse. Much of this pauperism may be attributed to the intemperate and improvident habits of the poorer classes; but they would be much more likely to be temperate and provident, if they were owners of an amount of land sufficient, with temperance, prudence, and industry, to support a family in comfort, and gradually to raise them to a higher social position. Besides, in the vast estates of the nobles, large tracts of land are wholly unproductive, devoted to parks for game, and other aristocratic uses.

In Ireland, the evils of this overgrown ownership of land, aggravated by the privilege of entail and the abuse of non-residence, had become intolerable; and the government was obliged to provide a remedy, by an Act of Parliament, requiring the sale and division of encumbered estates. Since that Act was passed, less than fifteen years ago, about one hundred and fifty million dollars' worth of property has changed hands. And it is a significant fact, that within these limits of time, the number of children in the national schools has increased by more than half a million, although the population has been reduced by emigration during the same period, fully two million five hundred thousand. To express the change in the form of a proportion, the attendance in the schools has increased two hundred eighty-five per cent., (from two hundred eighty-two thousand in 1843, to eight hundred four thousand in 1861,) while the population has diminished thirty per cent., (from eight and one-fourth millions to five and three-fourth millions,) showing an advance of above four hundred per cent., (four hundred seven,) in the popular appreciation of the value of education. This is but one index of that great social revolution which is transforming Ireland into an industrious, intelligent, prosperous and Protestant country.

England, with all her high advance in agricultural industry, does not raise grain enough to feed her own people; or at least, does not feed her own people with the grain which she raises. France, with a soil less fertile, with a much less perfect system of agriculture, and with a population only twenty-five per cent. less to the square mile, exports, when crops are good, from fifteen to twenty million dollars' worth of grain more than she imports. She raises on an average two hundred twenty-five million bushels of wheat annually, or nearly seven bushels to every inhabitant. This is accounted for in great part, by the fact that in France there are eleven million proprietors of land, or nearly one-third of the whole population, giving to each owner an average of five acres of arable land, while in England the proportion of land owners is probably not more than one in ten, at the most, and the greater portion of the whole cultivable land in the country is owned only by a few thousand nobles.

Switzerland—mountainous and snow-clad Switzerland—with a population only one-eighth less dense than that of France, and if the space that admits of cultivation be alone taken into account, quite as dense as that of England, raises a greater proportion of the food which its inhabitants consume, than England does. For in Switzerland, as in France, the land is divided among many small owners. The application of this principle to the different sections of our own country, is obvious. Our southern lands have been tilled by large and wealthy proprietors, and the result has been a lordly aristocracy, incompatible with republican ideas and republican institutions. Another result has been, the ignorance and degradation of the great body of the population, whether white or black, whether free or enslaved.

Slavery has no doubt been the chief cause and the worst aggravation of this state of society; but even apart from slavery, the ruin of these overgrown planters, and the division of their estates among a tenfold or hundredfold number of owners, would be a blessing to the land, conducive to productiveness, intelligence, virtue, and loyalty to republican ideas. We long hoped that this truth would become evident to these proprietors themselves, who were so proud of their monopoly of all the intelligence, and all the freedom, and all the nobleness of the land, as well as of all the land itself; and that considerations of political economy, of justice, of humanity, and of religion, would ultimately lead them to adopt more reasonable, righteous, and republican social institutions and forms of industry: but we were mistaken. Providence has brought the matter to another issue, and these overgrown aristocratic estates must be carved into smaller republican farms by the sharp sword of war.

The nutritive productiveness of the earth is affected, moreover, by the cultivation of unnutritious products. I do not refer to products which, though they do not furnish *food* for man, yet minister to his wants and his comfort, such as cotton, flax, and other articles which are manufactured into clothing, and used in various other ways conducive to human civilization and progress. These are only in one degree less necessary than the products which go directly to sustain the life of man. I refer rather to those growths of the soil which are either absolutely pernicious, or at least useless, and to those which are perverted to pernicious uses. Large tracts of productive land are occupied with crops of this kind.

In the United States, the land devoted to the culture of tobacco is more than twice the amount that is occupied with the cultivation of rice, (400,000 acres: 175,000 acres,) and nearly half as much as that improved in raising beans and pease. In England, the land appropriated to raising grain for the manufacture of malt and distilled liquors would more than suffice to produce all the wheat which that country now imports; and this last use of it in place of the former, besides saving the country the $80,000,000 or $100,000,000 which she now pays annually for foreign wheat and flour, would increase the industry and thrift of her laboring class, and greatly diminish intemperance and pauperism. Millions of fertile acres in the Turkish Empire, and in British India, are occupied with the opium poppy; and the manufactured product goes to diminish the productive industry of every country where the drug is in common use, as it is throughout almost all southern Asia.

The productive power of the earth is materially affected, again, by the difference between a state of peace and a state of war. War interferes with the supply which the earth produces for the wants of man in a variety of ways. It calls off many from the employments of agriculture to the service of arms. It diminishes the motives to agricultural industry, by making its avails uncertain and insecure. It lays waste fertile fields, and tramples down under its iron heel the unreaped harvests of the husbandman. Rival armies contend with each other for the ground where the rich harvests of autumn wave, as lately we saw in the valley of the Shenandoah ; and the result often is that the greater portion is destroyed, while only a remnant goes to feed the contending hosts, and the poor laborer is left to hunger and want.

War causes an immense waste in consumption. In the feeding of large armies, there is an utter disregard of all that economy and thrift which characterize the ordinary household consumption in times of peace. Some political theorists have regarded war as a convenient means of reducing a surplus population. It may well be questioned, whether war ever fails to reduce the *production* of a country in fully as large a proportion as it reduces population. If it did not, it would be reasonable to lock for a diminution in the price of the necessaries of life in time of war, whereas in fact it is well known that an advance in the prices of these necessaries is an almost invariable accompaniment of a state of warfare.

There is one more interesting view of the productive power of the earth, namely, its relation to the natural growth of population. There has been, from the beginning, a constant increase in the total population of the globe, constant, except as interrupted by one great judgment of God in ancient times. Population may be checked in a particular country, for a time, by pestilence, by war, by bad government and oppression. Thus want, discontent, and consequent emigration, have greatly reduced the population of Ireland within the last quarter of a century. And, on the other hand, a particular country may gain much more than its natural increase, as this country has gained by immigration from the old world. But leaving out of view these exceptional instances, in both directions, the natural tendency of population, in all countries not particularly barren, unhealthy, or ill-governed, is to a constant increase, up to the limit of their producing power.

If it be true, that our race is advancing in civilization, knowledge, virtue and power, then the increase of the world's population will go on in an accelerated ratio. If men live more justly, temperately and virtuously, they will live longer, thrive better, and rear larger families. If wars ever cease, one important check to the growth of population will be abolished. If oppression ceases, and good government obtains, prosperity will prevail, and where there is prosperity, population rapidly advances. If humanity and charity increase in the world, the poorer classes will be better cared for, better fed, better clothed, better housed, more healthy, more long-lived and more prolific. If sanitary and medical science advances, diseases will be less frequent and less fatal, and the average term of human life will be continually lengthening. These causes are already producing these results; mortality is decreasing; the average duration of human life is advancing, in the countries that have made most progress in civilization, good government, and benevolence. All these signs point to the approaching fulfilment of the prophecy of Isaiah: "There shall be no more thence an infant of days, nor an old man that hath not filled his days: for the child shall die an hundred years old; and he that misses of an hundred years (so some understand the latter part of the verse,) shall be reckoned accursed,"—'shall be regarded as cut off prematurely by a divine judgment.' In view of all these considerations, we are justified in expecting, if the world lasts, and mankind advances, a more rapid increase in the world's population than has ever taken place in the past.

Will the earth be able to feed so many new mouths? or is "the good time coming" darkened by the serious drawback of a prospective and permanent famine? We can hardly be much troubled by this apprehension. An all-wise Providence never lacks the means of adapting one part of its merciful arrangements to another; and if it be decreed that a happy period of health, longevity, and populousness shall dawn upon this suffering world, the food needful to support that population will not be wanting. Some pious political economist has said, in view of such a period of dense population, that should the exigency require it, no doubt God would bring another empty world alongside, to take off the surplus population of this, just as easily as the conductor takes on another car when the train is too full. There may be little likelihood of any such relief; but, yet, it does seem that some relief will by and by be needed. For while the productiveness of the earth may no doubt be vastly increased, there seems to be reason for anticipating a still greater and more rapid increase in the productiveness of the human species.

Let us look again more carefully at the probabilities on both sides. The lands that are now worse than wasted,—devoted to the cultivation of that which injures man, physically and morally, shortens human life, and entails incalculable misery upon families, and untold burdens upon society, may be reclaimed to their legitimate use; the uncultivated wastes may be improved; the parched land may, by means not yet understood, become springs of water; the deserts, not absolutely and incurably barren, may rejoice and blossom as the rose; and improved modes of cultivation may multiply many fold the harvests of the husbandman. The present population of the globe, according to the most reliable estimates is a little less than 1,300,000,000, (1,280,000,000.)

At the rate at which Belgium is peopled, the territory of the United States would nearly suffice for this entire number. And I have no doubt our country *could* sustain, even at the present rate of productiveness, if all our available land was under cultivation, a population as dense as that of Belgium, which is nearly four hundred (383) to the square mile. It is true that Belgium does not raise sufficient food for its present population; but it is also true, that only about two-thirds of the land in that kingdom is under cultivation,—less than five millions of acres out of seven millions two hundred and fifty thousand. Even in England, to say nothing of Ireland, Wales, and Scotland, there are about 3,500,000 acres of waste land that might be improved. This is more than one-tenth of the whole area of the country, and more than one-eighth of the amount actually under cultivation.

With all available land under improvement, and with the increased fertility which improved culture will bring, I think we may safely assume that the earth will be able to feed and clothe as many human beings as there are acres of cultivable land upon its surface. This would be equivalent to six hundred and forty persons to the square mile, a density of population more than sixty per cent. greater than that of Belgium, which is now the most thickly peopled country in the world. Deducting then from the 50,000,000 square miles which compose the land surface of the globe, the liberal allowance of one-fifth, for deserts, inland waters, mountain steeps, ice-bound regions, and lands otherwise not susceptible of cultivation, we have 40,000,000 square miles remaining, which would support, on the above assumption, 25,600,000,000 inhabitants, or just twenty times the estimated population of the world at the present time. This would give to the United States more than 1,500,000,000 inhabitants.

These numbers may seem amazing, and the supposition of such future populousness incredible. But let us consider the ratio in which the human race is actually increasing on the earth, and we shall see no reason to doubt that its growing population will fully keep pace with its utmost possible fruitfulness. Assuming that only 6,000 years ago, (and it is, in fact, considerably less,) there were but two human beings in this world, how many times has the number doubled itself, in the elapse of those 6,000 years? Less than thirty times. This is equivalent to doubling once in every 200 years. If the present population were doubled but five times, it would greatly exceed the vast number which we have estimated as the possible limit of the earth's capacity to support human life. That is to say, at this rate of increase, in less than 1,000 years from the present time there will be 30,000,000,000 human mouths for the earth to feed. But our calculation is at fault. We have overlooked that great destruction of mankind, which took place, according to the common reckoning, more than 1,600 years after men began to multiply on the earth. Beginning then with the flood, there were eight human beings on the earth forty-four centuries ago. Double this number twenty-six times and you have more than the earth's present population. This would be doubling once in about 170 years, and would allow less than eight centuries for the earth to arrive at that extreme density of population which we have assumed as the limit of its capacity to furnish food for man.

Are these idle speculations, based upon uncertain or extravagant data? If any think so, let them remember the rapid growth of our own country. In less than ninety years, we have increased from 3,000,000 to more than 30,000,000. This is more than equivalent to doubling once in every thirty years. If we make an ample allowance for immigration from foreign countries, the natural increase of our people, if it continue according to the past ratio, would double our population at least as often as every fifty years. This rate of increase, extended all over the world, would bring the population of the globe up to the enormous aggregate of 30,000,000,000 in less than 150 years. But it will probably be long before most countries of the earth attain to that measure of liberty, good government, and prosperity, which has given us such an unprecedented increase.

Still, these estimates show what the present system of things is capable of, according to the laws which have regulated the increase of population in times past; and they give rise to grave thoughts in regard to the future destiny of this world. According to what seems to be but a sober and moderate estimate, in less than one thousand years at the farthest, in about one-sixth of the time that mankind have already existed in the world, the number of human beings on the globe will fully equal the capacity of the earth to sustain them, according to any rate of productiveness in the soil which experience authorizes us to expect.

What then shall we conclude? Shall fish be substituted for flesh and grain, and will man learn to be an amphibious cultivator of the watery acres, and all the year become one long Lent? Shall we have recourse to the supposition of a miraculous millenial fruitfulness of the ground, and endorse the prediction of Father Papias, the sanguine Chiliast bishop of the second century? "The days will come," he says, "in which there shall grow vineyards, having each ten thousand stocks; and each stock ten thousand branches; each branch ten thousand shoots; each shoot ten thousand clusters; each cluster ten thousand grapes; and each grape, squeezed, shall yield ten thousand measures of wine, (of nine gallons each;) and when any of the saints shall go to pluck a bunch, another bunch shall cry out, 'I am a better bunch, take me, and bless the Lord through me.' In like manner, a grain of wheat sown shall bear ten thousand stalks; each stalk ten thousand grains; and each grain shall yield ten thousand pounds of the finest flour; and so all other fruits, seeds and plants, in the same proportion. These things," adds the simple-hearted enthusiast, "are credible *to those who believe.*"

But if our faith falls short of this millenarian measure, to what other supposition shall we have recourse? Shall we apprehend some second great catastrophe, like the ancient deluge, to relieve the overburdened earth, that it may start anew, with only the remnant preserved in some new ark? That supposition is forbidden by the voice of prophecy, assuring us that such a calamity shall never be repeated, but that the earth shall go on in its regular course of seed-time and harvest, and multiplying population, till the end of all things. The seven-hued bow in the clouded heavens, settles that doubt forever. Is the end of all things, then, as near as Dr. Cumming and his impatient adherents suppose? Are we rapidly approaching the final consummation, when the world and the works that are therein, shall be burned up? We do not undertake to decide between these alternatives; we only say, that unless there is some undiscovered error in our calculations, there is sufficient theoretical ground to justify the raising of such questions. We are content to leave the solution of them to an all-wise Providence.

The Creator of man placed him upon the earth, with his task explicitly set, to "*replenish* the earth and *subdue* it." It is yet far from being replenished; it is yet far from being subdued. But our race is now accomplishing both parts of this mission with a rapidity altogether unprecedented in the ages past—multiplying its numbers, subduing the wilderness, and yoking the powers and forces of nature into its service, as never before. Notwithstanding the doubts which our figures seem to justify, we are persuaded that these two operations will go on nearly parallel, so that the earth will not be replenished long before all the dominion that man can gain over nature shall be won; nor the earth thus subdued, until it is replenished nearly to its utmost capacity. When those limits shall be reached, and what shall thereupon ensue, we may calmly leave to the decision of Infinite Wisdom. The matter belongs to those times and seasons which the Father hath put in His own power. He who commanded man to "be fruitful and multiply, and replenish the earth," will never suffer the world to become so populous, that the demand for food shall exceed the possible supply. However multipied His human creatures may be, He will find means to satisfy their wants, and to fill their hearts with food and gladness. At any rate, "sufficient unto the day is the evil thereof." And we at least may say, sufficient unto the day is the food thereof.

Our loaded tables, at these our annual feasts of harvest, sufficiently relieve us of all fear that we or our children will have to be put upon "short allowance," in consequence of the exhausted capacity of the earth to give us food. We may not say, revising the ancient motto of improvident selfishness—"after us the famine,"—"let posterity take care of itself;" but we may safely and trustfully leave posterity to the care of that benignant and wonder-working Providence, which has supplied so bountifully the wants of the generations that have gone before us; and in the mean time, we may "eat our meat with gladness and singleness of heart, praising God."

If our speculations have encouraged the expectation that the earth is destined to be far more fruitful, and far more populous than it has ever yet been, that expectation agrees with the utterances of inspired prophecy. And if, at the same time, our speculations have conducted us to the conclusion, that the present system of things cannot continue always, that the rapid multiplication of human beings upon the earth is tending towards a *crisis* in the world's history necessitating some extraordinary Divine interposition to meet the emergency, that conclusion too is in accordance with the explicit declarations of the oracles of God. And so we come back from our wide wanderings over the earth, and down the ages, bringing home at least this one sheaf of practical wisdom, that the laws of nature and of human progress are working out the very results which the Scriptures announce. Our speculations, however fanciful some of them may have seemed, will have done more than to amuse an idle hour, if they shall serve to present to our minds, in any new aspect of evidence or impressiveness, the important truth, that the God of nature and of providence, is the God of the Bible, and that "the testimony of the Lord is sure, making wise the simple."

ADVANTAGES OF RURAL PURSUITS.

From an Address before the Norfolk Agricultural Society.

BY BENJAMIN F. THOMAS.

What lessons are written for us, farmers, in the earliest record of the human race. The first man, fresh from the moulding hand of his Creator, bearing his yet unmarred image, was a gardener. "And the Lord God took the man and put him in the garden of Eden, to keep and to dress it." As he looked with joy and admiration upon the new creation, with what intense emotion must he have heard the voice of his Maker, giving him dominion over the earth, and commanding him to replenish and to subdue it. To the All-seeing Eye the work was very good. Well might the morning stars sing together, and all the sons of God shout aloud for joy. From that hour to this, it is in the culture of the earth that man has gone back nearest to the glory of his first estate, the Eden of tranquil joy and peace.

The next lesson is like unto the first. The curse that fell upon the second man cut him off from the culture of the earth. And the Lord said unto Cain, When thou tillest the ground it shall not yield unto thee her strength. And Cain went out from the presence of the Lord and built a city. Went out from the presence of the Lord! How many a young man who gives up the quiet occupations of rural life for the struggles and terrible temptations of the market-place and the forum, goes out from the presence of the Lord, leaving behind him the simplicity and purity of life and thought by which his childhood was drawn near to Him; the loving eye, which saw Him in the smiling bud of spring and in the golden fruit of the harvest; the loving ear, which heard Him in the falling shower and in the surging wave. And for what does our young man give up the quiet, the beauty, the freedom of rural life? To sport and flutter awhile in the gay saloons of fashion; to waste the vigor and freshness of youth and early manhood in the pent-up air of some office, mill, or counting-room, or, perchance, to be the servant of servants—the servant of the people—now basking in their smiles, now shivering in their frowns, kissed at one moment and kicked at another, with no special cause for either kick or kiss. Few errors of opinion are more harmful than the underestimate of the worth and dignity of rural pursuits, which hurries so many of our young men from the farm into the already crowded ranks of professional and commercial life. The exchange and the forum may have some brilliant prizes, but how many fail compared with those who win, and how many of those who win find the fruits of victory turn to ashes in their grasp. Who shall garner up the blighted hopes, the wasted frames, the broken hearts that lie thickly strown on the fields of the world's conflict and struggle?

I know that I have always looked upon rural pursuits with a *loving eye;* but weighing them in the scales of a *sober judgment*, they will be found wanting in nothing essential to a happy, manly and useful life.

If a young man seeks a competence of this world's goods, there are no shares—factory, bank, or railroad—that in the long run pay better dividends than the ploughshare. Agriculture, even in New England, pursued with system, with a wise economy, and with the skill which results from science tested by experience, and experience illumined by science, yields as much wealth as it is good for a man to have; more than the average of other pursuits; enough, at any rate, to enable us to live comfortably, to educate our children, to provide for the rainy day or shady slope of life, and to obey the calls of Christian charity and neighborly kindness. More than this cometh of evil. We are beginning to understand that, even in this world, the rich man has no place in the kingdom of rest and of peace. When we add the comparative certainty of the farmer's gains, his exemption from the sudden reverses which test so severely not only the mental but the moral strength of men, his freedom from corroding anxieties and cares, the balance, even as a means of living, will be found in favor of rural pursuits.

If a man love home, the serenity and peace that are found only beneath our own roof-tree and on our own hearthstone, he will cling to the farm. Domestic happiness finds there its most congenial soil. Poets and painters have but expressed the common convictions of mankind, when they have environed their pictures of home with the objects and wreathed them with the atmosphere of rural life. But of the general comfort and happiness of rural pursuits, I need not say much in this presence. There is a view of the matter, however, which has always struck me with great force, but which I do not recollect to have seen brought into distinct notice. It is the visible, palpable result of agricultural labor. There is nothing so requites toil as a visible, palpable result. Most men cast their bread upon the waters, with the trembling hope that it may return in many days. The farmer scatters his seed upon the soil, sees the bow of promise which the hand of the Lord hath bent above him, and lies down to rest assured that summer and winter, seed-time and harvest, will not utterly fail upon the earth. Every day's labor tells. The results of his toil greet him morning and evening, as he goes to or returns from his labor. That rough, unsightly bog-meadow, into which he slumped so often when a boy, now smiles on him in beauty, and rejoices with him beneath the weight of its luxuriant crops. That twig of a tree, which in a thoughtful moment he planted with care, now shelters him from the noontide sun, or bends to the earth with luscious fruit. Order succeeds confusion, the waste places are redeemed, the rough places made smooth. That neat, compact, comfortable dwelling, that well-arranged, capacious barn, with cellar beneath, those solid stone walls, that thrifty orchard, those fields of waving verdure, that sleek and well-fed stock, how they rejoice the eyes and gladden the heart and reward the skill and patient industry and energy of their owner!

And the fruits of his toil are not only palpable but comparatively certain. The earth returns his devotion with even more than woman's fidelity. Year after year she increases the number of her gifts, demanding only in return vigilant care and the refuse of the products he cannot use.

But if a man has hopes and aspirations which do not cluster about home, if he would move the world outside of his farm, the farm, nevertheless, is a grand starting point.

If, for example, a man hankers for political distinction, the thirst for which has been one of the greatest curses that has afflicted our country, (the locusts of Egypt were mercy in comparison,) it will by no means mar his prospects to have the title of farmer prefixed to his name. It throws that of esquire or reverend at once into the shade. The prophet sought for the king of Israel among the shepherds of Bethlehem. The Romans found the Saviour of the republic at the plough. The Father of his Country was a Virginia planter. With the Farmer of the Hermitage and the Farmer of Marshfield our dear old homestead remained undivided.

There is, doubtless, more or less pretension about the matter. Every aspirant for office who ever rode within sight of a cornfield, or whose grandfather ever held a plough, is, for the nonce, a farmer. But there is a valuable truth underlying this pretension. It is a deep and prevalent conviction that rural pursuits keep the mind and heart in sound and healthy tone; that they who till the soil and moisten it with the sweat of their brows, cannot but love it; that his heart must be cold and dead, who, standing beneath the tree in whose shade he sported in childhood, and looking out upon the broad acres his skill and muscle have subdued and clad with beauty, does not feel with singular depth and earnestness,

"This is my own, my native land."

If a young man has higher, nobler aims in life, the development and culture of mind and heart, what better school is there than the culture of the earth? I mean, of course, the culture of the earth in the light and with the eye of science. The science of agriculture, beautiful as it is profound, looking into the very heart of Nature's secrets and mysteries, at once the interpreter and handmaid of creative wisdom and power, will feed, refresh and strengthen the mind, at the same time that it fits it for every day's duties. And the close observation and study of Nature, in her beauty and her divine economy, and of that almost tangible Providence which moves in the procession of summer and winter, day and night, seed-time and harvest, and looks out upon us through the myriad forms of organic life, can they fail to exalt and purify the heart, and ripen it for that harvest which is the end of the world, and whose reapers are the angels?

No pursuit has a truer dignity or a nobler aim. The farmer is the co-worker of the Creator. God is the great cultivator. He lifts up the mountain of rock from the bosom of the earth, and when the fire which heaved it from its deep foundations has gone out, the process of cultivation begins. The atmosphere wreathes itself around the granite's face, and softens it. The rain bears the impalpable dust to the plain. The seed is borne to it on the wings of the wind. The solitary place is made glad, and the wilderness buds and blossoms as the rose.

A beautiful example of Nature's processes of culture may be found in the agency of water in the formation and growth of organic life—water, itself the most beautiful of the works of God, the emblem of His purity and goodness, one of the chief ministers of His ever-creating and renewing power. Borne upon the bosom of the air, the watery vapor softens the rock and creates the soil itself. Mingling with and impregnating the atmosphere, it penetrates and permeates the soil, finds its way into the leaf and pores of every plant, and mingles with the life-blood of every living being. It rises with the atmosphere, which holds it in suspension in proportion to the warmth of its temperature. When the air touches the colder mountain-top or mountain-side, it bears behind, in the floating mist or cloud, a portion of its burden. This re-appears in the rill or gushing spring on the thirsty plain beneath. Again, when a warmer current of the air, charged with moisture, meets and mingles with a colder current, the mean temperature, which is the result of the union, is incapable of holding in suspension the mean quantity of vapor. Again, the cloud is formed and the excess of moisture falls to the earth in the refreshing and fertilizing shower, washing the air as it passes, of the vapors which, noxious to man, yet minister to vegetable life.

Observe another form of the same beautiful process—when as night approaches and the surface of the earth begins to cool, the air in contact with it begins to cool also, and, like the current on the mountain-top, to give up a portion of its watery burden. This water descends in particles infinitely minute, which collect on every leaf and hang on every blade of grass in drops of glittering dew. "Mark here," says Professor Johnston, to whom I am indebted for the material of this illustration, "a beautiful adaptation. Different substances are endowed with the property of radiating their heat, and of thus becoming cool with different degrees of rapidity, and those substances which in the air become cool first, also attract first and most abundantly the particles of falling dew. Thus in the cool of the evening the grass-plot is wet while the gravel-walk is dry, and the thirsty pasture and every green leaf are drinking in the descending moisture, while the naked land and the barren highway are still unconscious of its fall."

I shall have occasion, in a moment, to observe how the practice of deep and subsoil ploughing proceeds upon and takes for granted this agency of water in the production and growth of vegetable life.

To subdue the earth and to replenish it; in this first commandment lies the epitome of our art.

To subdue the earth and to replenish it is to fit it for the abode of cultivated, developed man.

In redeeming the bog meadow of which I spoke, what has the farmer accomplished? If prudently done, at times of relief from other work, he has added greatly to the value of his estate. He has given beauty, softness and finish to the landscape. Every traveller that passes that way has cause to bless him. He has sweetened the air, made his own and his neighbor's abode healthier, and given a ruddier tint to the rose upon his daughter's cheek. He has increased the capacity of the earth for the very end for which it was made. That portion which was before worse than useless, now affords means of sustenance and support for a human being.

Look at the same thing on a larger scale. In 1780 the island of Great Britain contained about nine millions of inhabitants. In seventy years the population doubled, and the quantity of food raised upon the island was more than doubled. It is estimated that under the improved systems of agriculture, the food necessary to sustain forty millions of beings may be raised on this little speck of the ocean. We can understand this when we find that on the estate of Mr. Coke, (afterwards Earl of Leicester,) the rental has increased eight-fold in fifty years—from £5,000 to £40,000.

But the dignity and worth of your calling is shown not only by the great fruits of its labors and progress, but by the large requirements it makes of those who would prosecute it with skill and success. To subdue the earth and to replenish it. To subdue the earth, we must understand its powers, or laws of growth and production, and must so prepare the soil as to give the freest and fullest play to those laws; science must be combined with art—the culture of the mind with the culture of the soil.

The plant that springs up at my feet, on what food does it feed? What condition of the soil is necessary to ripen and perfect its fruit? To answer these questions, which every season repeats to the farmer, is the province of science. The plant must have nutriment. I will feed it. But will the manure on my fork assist or check its growth? Will any of its properties enter into the composition of the plant? Again, I plant wheat in my field this year. It takes up for its nourishment and nearly exhausts certain properties of the soil. What shall I do? Science gives the answer. She says sow a root crop the next year, and while you are raising the root crop the influence of the atmosphere on the soil, aided by culture, will prepare and render soluble the food which will supply the wheat the year after. It is thus we can understand the remark of Professor Johnston, that the art of agriculture is almost entirely a chemical art, and that nearly all its processes are to be explained upon chemical principles.

And this is true, I conceive, not only of what may be called the natural but the mechanical processes of agriculture. The mere passing of the ploughshare or the harrow through the soil can have, of itself, no effect in increasing its productive powers. How, then, does the deep ploughing of dry land and the stirring of its subsoil increase its fertility? Mainly by increasing its power to absorb water, through whose gentle agency the food of plants is dissolved and held in solution for its use. "This power of land to absorb water," Mr. Humphrey says, "depends in a great measure upon the division of its parts. The more divided these are, the greater its absorbent power. When this power is great, the plant is supplied with moisture in dry seasons. The effect of evaporation in the day is counteracted by the absorption of aqueous vapors from the atmosphere, by the interior parts of the soil during the day and by the exterior and interior during the night." I have thought of this remark when I have seen a man plant a tree, by digging the soil just deep enough to cover the roots, and then setting it on hard pan or a gravel bed, wonder why it did not live, or if it did languishingly live, as we say in the law, why it did not grow; as if a tree as well as a man had not an inherent right to die of thirst or starvation. Put the same tree upon good rich loam, thoroughly stirred and decomposed to the depth of two and a half or three feet, and if underdrained all the better; keep the ground open and loose about it, give it a little mulching, in a dry season, and its growth will be such that Jonah's gourd will no longer seem miraculous.

The object of all mechanical operations on the soil is to expose the greatest possible surface to the influence of the atmosphere. The plough, the harrow, the spade, the hoe, accelerate the decomposition of the soil. The rapidity of the decomposition of a solid body increases with the extension of its surface. "The more points of contact we offer," says Liebig, "to the external chemical agent, the more rapid will be its action." An extension of surface almost infinite, any one can see, is gained by the subdivision of its particles.

But into the detail of this beautiful science of agricultural chemistry I may not venture to go further, I fear I should soon get beyond my depth. These imperfect illustrations may suffice to show that we must have its aid and guidance, if we would thoroughly subdue the earth. I should be happy if I thought they would attract you to the study of the science itself. Its principles should be better understood. They underlie our art. They are at once the seed and the fruit of its progress and growth.

This doctrine of the necessity of thoroughly subduing the earth may throw some light upon the vexed question of small or large farms. And with farmers of moderate capital the difference is just this. On the small farm we may subdue the earth; on the large the earth subdues us.

But we are commanded not only to *subdue* the earth, but to *replenish* it,—to restore to the soil the substances which have been taken from it, and which the atmosphere cannot supply. The earth is liberal, but she is exact also. She asks only for the refuse matter, which we cannot use, but she asks for all. Her cry is, restore. Her work is re-production. Give back, she says, what I have lent. No matter how vile the form, it shall come to you again in the blooming flower, the luscious fruit, the golden grain.

We hear much of the comparative value of the sciences,—the moral and the exact sciences. After all, there are few sciences more beautiful or of greater practical worth than the science of manures. How shall we procure and preserve the food of plants, and how shall we distribute to each its appropriate food? for plants differ in their tastes and habits, and what is nourishing to one is noxious to another. To answer the last question requires a knowledge of organic chemistry. The answer to the first is comparatively simple. The only way to get along is to save all, to gather up all the fragments, so that nothing be lost. There is not a green weed that grows by the road-side, nor a refuse bone that a dog leaves in the door-yard, that is not worth caring for. It grieves a man's heart to see how the most precious food of plants, their very life-blood, is wasted and lost. The late Judge Buel, of Albany, estimated that the eight millions of cultivated land in the State of New York were capable of producing sixteen million loads of manure, (an under-estimate, in my judgment,) but that in point of fact they did not produce more than four millions. Estimating the value at a dollar the load, the difference every year is twelve millions of dollars.

When we come to aggregates the importance of the subject is apparent. Does our practice show that we feel it? How many a barnyard, even in this county of Norfolk, can be found on a hillside, near the highway. First comes the sun. He takes what will pass off in a gaseous from. Then comes the rain or melting snow, and what of strength is left is washed or trickles into the road. The owner of that barnyard must be of opinion that the importance of manures is overestimated. He might just as well take the bank bills he gets for his hay or grain, and put them behind the back-log, as to waste such precious mint-drops. I believe there are farmers in every county of the State, and many of them, on which in the life-time of their owners, manure enough has been wasted to pay for the price of the farm.

Now, without going far into the chemistry of the matter, every body understands that the manure from organic matter may be in liquid, solid or gas. The solid is all that most farmers save, and that imperfectly. How can we preserve the liquids and gases? The answer is obvious, by putting into the barnyard and barn-cellar some substance that will absorb and retain them. This is the philosophy of the compost-heap. The earthy matters absorb and retain the fertilizing properties of the liquids and gases, and impart them again to the plants. By covering with loam the fermenting dung-heap, you retain the gases which would otherwise take wings, and by coating the barnyard with loam you save the liquids, which otherwise would run away or evaporate.

The earth must not only be thoroughly subdued, but liberally and constantly replenished. A plant, like an animal, must be fed. It is a living being, with organs of digestion. Give it good, nutritive food, and enough of it, and it will laugh and grow fat; give it poor, scanty food, it will pine and die. You may as well starve your cow as your corn.

Without the aid of science, the observation of every farmer tells him that the principal food of plants is organic matter, vegetable or animal. Keeping this simple fact in view, some practical conclusions seem to follow. First, that it is as wise to waste the food of plants as of stock; manure, as hay or grain. Second, that it is as judicious to feed two acres of plants with food sufficient only for one acre as to winter two cows on hay just enough for one. Third, that supposing the farmer has the requisite labor to subdue the land, the quantity to be cultivated must depend upon the manure he is able to make, save or buy. Fourth, that the farmer who begrudges the systematic care, labor or expense of preserving his manure, saves at the tap but loses at the bung.

AGRICULTURAL HALL.

From an Address before the Barnstable Agricultural Society.

BY GEORGE MARSTON.

[The Address was dedicatory of the new Hall of the Society, erected in place of one demolished by a gale, in March, 1862.]

And now we have come up hither to dedicate, by simple ceremonial, the edifice to its uses; to offer it to the society for whom it was erected, and to the public, whose interests it may subserve. We dedicate it to the cause of agriculture; to the cause of labor in all its departments; to the cause of social improvement; to "sincerity, good humor, and all social affections and generous sentiments among the people." Long may it stand, to promote all these interests, and to prove the wisdom of those who have generously aided in its erection. To all of them we commit it; but first and foremost, to the great interest of agriculture, above and beneath, controlling and subserving all others. In that department of labor we have, even here upon Cape Cod, much to hope and much to attain. I do not speak of what is possible, but of what is practicable. We can make, by proper effort, and by systematized industry, the agricultural productions of this county double, and even quadruple what they have been and are at present. Leaving out of view some of the branches of cultivation, which have recently received more than their share of attention, it is safe to assert that our crops of grains, of which we consume so much more than we produce, can easily be largely increased, and that, too, at a cost which, on the whole, shall not be unremunerative. To direct, to economize, to systematize our agricultural efforts, should be our constant aim, until this annual gathering shall exhibit an advancement in field products equal to what we have attained in other and different pursuits. To this work of improvement—real, substantial and beneficial—we devote this edifice. Here shall our children and our children's children assemble, year after year, to do homage to that immense interest which sustains all the other affairs of civilized states.

There never was a time, in the history of our country, perhaps of the world, when the controlling importance of agriculture was so apparent as now. Well may we come up to our temples to pay our vows and renew our pledges to this imperial interest of civilization. Well may those who are the earnest and laborious devotees of husbandry be proud of the position they hold. Throughout the world, to-day, agriculture is king! It governs all things. And as states rise in the scale of human progress, so does this great interest rise in relative importance. When other affairs become embarrassed or depressed, this becomes buoyant and dominant. It was said of the great New England statesman, whose love for this ennobling pursuit renders his "counterfeit presentment" a fit ornament of this place, "that it is matter of notoriety that the fear or the prospect of a short crop in England deranges and agitates the business transactions and commercial speculations of the whole trading world." We well know that the fact of abundant harvests here, and that of small crops in some parts of Europe, to-day, keeps England at bay, and holds the entire spirit of toryism at defiance. But we need not look beyond the Atlantic to find full proof of what has been asserted. To-day, while the life of our Republic is menaced, while fearful war is raging over a third of our States, while so large a proportion of our producing population is in arms, and are changed to mere consumers, the agriculture of the north and north-west is bearing up the country in its stalwart arms, and carrying it safely along to assured triumph and permanent victory. True it is here, to-day, that agriculture is king; imperial in its power, but at the same time so benignant in its supremacy, that all the world pays willing homage at its feet. While we are struggling to maintain the life of our government, fighting the battle of humanity and free institutions in this terrible encounter, the country turns with confidence, never to be disappointed, to the farmers of the temperate north. and, resting on their labors and sacrifices, is upborne along its pathway, bristling with the bayonets of grim-visaged war. Not more certainly do they serve her cause who bravely contest on the field of strife, than do those who labor to feed the million of men in arms, and the many millions of non-producing dependants they have left behind. The farmers of the north are as truly the soldiers of the Union as are they who are trained, and brigaded, and set for battle. To them great duties are confided, duties not second to those of the squadrons in the field. Let them not undervalue their position in this time of trial. They serve the glorious cause honorably and well, at home, when they sow, and toil, and gather in their harvests. As Milton has said, with that serene philosophy which animates every line of his lofty verse—

> "They also serve who only stand and wait."

Nor can we fail to compare, in this struggle between the interests of honorable labor, on the one hand, and labor dishonorable and servile, on the other. What an immense agency for good, in its comparative force, is the free, intelligent farming population of the north, as opposed to the menial, trembling, oppressed, unwilling laborer at the south. The cause of free labor is the cause of civilization and humanity. Every man who cultivates the soil is a faithful laborer in the cause of the Republic; is serving the highest purposes which intelligent and earnest manhood can ever pursue.

With what a ready and responsive hand do all the great movements of nature wait upon these. Her forces, apparent and hidden, are all working to the same sublime result; they are the untiring champions of the right and the true. While all is upheaved in storm in this country of ours, and all we value is trembling in the balance, no instrumentality of nature is latent or lost. Trampled beneath the hostile hoofs of contending squadrons, the earth may hold its bated breath, and for a time refuse to put on its garments of verdure and of bloom. But her energies and her beauties only sleep and wait; they are not overcome or destroyed. Spring time will come again, when the "winter of our discontent" has over-past, and new grass shall clothe the hills and new violets spot the meadows.

"While flags of war like storm-birds fly,
And charging trumpets blow;
Yet rolls no thunder in the sky,
No earthquake strives below.

And calm and patient nature keeps
Her ancient promise well,
Though o'er her bloom and greenness sweeps
The battle breath of hell.

And still she walks in golden hours
Through harvest happy farms,
And still she wears her fruits and flowers
Like jewels on her arms.

Ah! eyes may well be full of tears,
And hearts with hate are hot;
But even-paced come round the years,
And Nature changes not.

Still in the cannon's pause we hear
Her sweet thanksgiving psalm;
Too near to God for doubt or fear,
She shares the eternal calm.

She knows the seed lies safe below
The fires that blast and burn;
For all the tears of blood we sow
She waits the rich return.

She sees with clearer eye than ours
The good of suffering born;
The hearts that blossom like her flowers
And ripen like her corn.

Oh, give to us her finer ear
Above this stormy din;
We too would hear the bells of cheer
Ring Peace and Freedom in."

FARMS.

ESSEX.

Report of the Committee.

The farm of Dr. George B. Loring, usually called the Pickman Farm, situated in Salem, having been offered for the society's premium, was visited by the committee on the 14th of August and on the 5th of November. The illness of Dr. Robinson, an important member of the committee, and a most valuable member of the society, prevented his attendance. His place was supplied, at his own request—and the committee were happy in being favored with the attendance of Gen. William Sutton as a substitute, at their first meeting.

Dr. Loring has given the committee great pleasure by offering his farm for premium, and thus giving the society and the public the benefit of his statement, constituting as it will the most important part of this report. He is the only claimant the present year.

This noble farm is situated in South Salem. It touches Lynn upon its south-west border, and adjoins the lands of the late Judge Putnam on the same side, while the farm of the heirs of the late E. H. Derby touch it on the west and north-west.

As you enter the parlor of the farm-house—which was occupied for some generations by the Pickman family—you notice what ought to be seen in every farm-house, a finely drawn plan of the farm, made from actual survey, by which we learn that it contains some four hundred and thirty acres, but more exactly as follows, viz. :—

	PREMISES.	Statute Measure.		
		Acres.	Roods.	Rods.
No. 1.	House, yard, barns, &c.,	1	1	17
2.	Orchard,	6	2	–
3.	Orchard west of house,	2	3	–
4.	Arable land in front of house,	5	1	13
5.	Marsh by Forest and Pickman rivers,	6	1	3
6.	Upland,	8	2	23
7.	Marsh and meadow north of river,	9	–	14
8.	Upland,	6	1	35
9.	Marsh,	8	2	25
10.	Upland,	11	2	24
11.	Marsh,	12	3	26
12.	Marsh,	1	1	28
13.	Marsh,	3	1	30
14.	Upland pasture,	21	3	17
15.	Upland,	9	1	14
16.	Upland and swampy meadow,	50	2	36
17.	Great pasture,	113	2	26
18.	Upland,	10	–	8
19.	Orchard,	1	–	–
20.	Nursery, orchard,	1	–	17
21.	Virginia orchard,	14	–	–
22.	Upland,	27	2	13
23.	Upland,	89	3	25
24.	Piece on Marblehead road,	4	1	27
	Totals,	428	–	21

The country seat of the Doctor is a fine mansion, situated upon a beautiful eminence, some one hundred rods south-westerly from the farm-house, built by himself but a short time since. It is surmounted by an observatory, from which the view is extensive and beautiful. The ascent from the plain to the mansion is by a somewhat winding way, of easy grade, while the descent upon the opposite side towards the Lynn and Marblehead road, in the bend in Forest River, is abrupt and wooded.

But the farm. At the time of the August visit of the committee, our attention was first called to the underdrained field in front of the farm-house, a full account of which was given by the owner in the Society's Transactions in 1859. One acre and one-eighth at this time was in mangel wurzel, and the balance (four and three-eighths acres) in English grass, the second crop being perhaps half grown. The whole field was underdrained by the present owner in 1857, before which time "it was good for nothing." It was of this field that a former occupant and lessee speaks in his statement, made thirty-two years ago, when he says: "There is of wet meadow land not more than five acres, which is never tilled, but drained, and yields good crops of stock hay." At the time of the committee's recent visit, (in November,) the crops had been harvested. Upon the one and one-eighth acres in mangel wurzel the crop measured sixteen hundred bushels, or fourteen hundred bushels to the acre! The two crops of English grass upon the four acres and thirty-three rods *measure* twenty-seven tons. It is proper to state the method by which the quantity was ascertained. The hay was upon the scaffold and occupied the space from the scaffold floor to the great beams, a height of eight feet. One of the bands was measured, and seven hundred cubic feet were estimated to weigh a ton. By this method (one usually adopted and considered reliable where weighing cannot be had) the first and second crops upon this piece of land are found to amount to the astonishing quantity already mentioned —twenty-seven tons, or six and four-tenths tons to the acre. As Dr. Loring's method of draining, together with his description of the land before draining, were minutely described by him in the Society's Transactions for 1859, already referred to, it is quite unnecessary to repeat any part of his statement in this report. That part of the land under consideration where the above mentioned crop of mangel wurzel has been this year grown, with the exception of the one-eighth of an acre, which was in potatoes, was in corn in 1861; and the crop, as Dr. Loring informed the committee, was ninety bushels of shelled corn. The amount of manure applied for the corn-crop was twenty-five ox-cart loads, spread and ploughed in. For the mangel wurzels this year forty-seven loads were put on, twenty-five being ploughed in, and twenty-two loads put in the drills; the said drills being two feet apart.

The remarks of Dr. Loring, casually made during the committee's walk over the farm, on the subject of succession of crops in connection with the field above mentioned, are regarded as too valuable to be lost. "Mangel wurzel will follow ruta-baga well, but the reverse is not true. Ruta-baga grows smooth and handsome on new land taken up in June and well manured.

The *late sowing* of ruta-bagas is indispensable, as the aphides (plant lice) are far less likely to attack the plants. Mangel wurzel will do but little upon dry, sandy or gravelly soil—it requires a rich and *heavy* one, but ruta-baga does best on what the wurzel rejects." It is indeed upon precisely this kind of soil—*a heavy and rich one*—that the astonishing crop of mangel wurzels was produced. Some of the roots weigh eight or more pounds. Dr. Webster defines this vegetable as the *root of scarcity*, a definition hardly appropriate upon the Pickman Farm. Previously to the underdraining in 1857, the water had been carried off, if at all, by surface drains, some four feet wide at top; drains always greatly impeding the operations of mowing and carting off hay.

Ruta-Bagas.—When the small amount of labor which this crop usually requires is considered, it will be found to be one of the most remunerative of crops. It does not require high manuring—and one or two applications of the hoe, and that, as the owner says, at odd jobs and in dull weather, is all. Two and one-half acres were ploughed in June, thus late to avoid the plant louse, so destructive when sowing is done early; and the committee's judgment was that from two thousand to two thousand five hundred bushels would be harvested from that field. The roots were smooth and beautiful, and usually command one dollar per barrel. Dr. Loring's method of keeping the ruta-baga is interesting, because it saves labor besides being effectual. The roots are put into pits dug some four feet deep, and of about the same width, and twenty feet long, more or less. Notwithstanding the fair price of this crop at market, we understand the owner to say all his roots are fed out to the cattle and horses; beginning from the time of their coming to the barn. Every thing except the roots is subjected to the steaming process—apparatus for which is not wanting.

Carrots.—This crop, grown upon three-fourths of an acre, seems not fully to have realized the reasonable expectations of the owner. Still it is a fair one—we should call it a great one, did not other root crops exceed it, though of the amount no estimate by the committee was made.

Indian Corn.—The corn-field, of fourteen acres, (together with one acre of turnips,) is west of the railroad from Boston to Salem. The time of the committee did not admit of visiting this field in November. That it suffered in spots from the worms was evident in August.

Manures.—Fresh meadow mud is dug in September to the amount of some five hundred ox-cart loads, and kept exposed to the frost during the winter. It is then mixed with one hundred casks of lime and well forked over. Dr. Loring applies phosphate of lime in the hill before dropping the corn. About one ton was used upon the above mentioned fourteen acre lot, west of and adjoining the railroad. Dr. Loring's method of treating salt marsh sods will be interesting to all who have occasion to deal with them, and will no doubt appear in his statement to be published herewith. It is well known that the surface sods taken from the marsh are generally well nigh indestructible when exposed to the action of the air, and even when chopped fine and laid in the cow-yard they are often inveterate. Swine will usually work them up as well as any thing; but the cotton wool character clings to them so tenaciously that many farmers reject them altogether, and would never remove them from the marsh, except upon the principle of abating a nuisance. As soon as they are thoroughly frozen, Dr. Loring has them deposited in his barn-cellar, where they are covered by cattle droppings and remain frozen during the winter. On exposure to the air in the spring they fall to pieces and mingle with other ingredients readily; thus saving the labor of a mechanical division, always laborious, and imperfectly done at best.

Of the artificial manures, Dr. Loring is satisfied that ground bone outlasts all others. It is not known, however, that any *mill* suitable for grinding bone is within the reach of Essex County farmers. The bone meal sold at the agricultural stores has all the appearance of *burnt* bone ground. What effect the burning may have upon the lime is not clear; but that all the animal fibre and oils have been destroyed, the absence of effluvia abundantly testifies.

Buildings.—Having already alluded to the house, the buildings next in importance are the barns. By a description of them in a back number of our Transactions it appears that "there are two upon the place, one a hundred feet in length, and thirty-five feet in breadth; the other, one hundred and fourteen feet long, and forty-two wide. The latter has a cellar under the whole of it; the main part of which is for manure, and receives all the deposits of the cattle. A portion of this cellar is inclosed for the storing of fruit and vegetables."

A steam boiler situated between the two barns throws the steam into both, for cooking the corn fodder and the hay. The piggery is under the south-easterly barn. The swine are kept in four or more pens. We noticed two fine litters of young pigs. The swine are of different breeds—from the snug Suffolk to the coarse Chester, all handsome and well fed. For a fuller description of this important department, we would refer to the statement below.

The indispensable tool shop is not wanting on this magnificent farm. The articles are "too numerous to mention"—a horse hoe, all of iron, with three cutters and a wheel; a hand weeder, having a wheel forward with five flat cutting knives flaring both ways, &c., &c.,—tools with which some of the committee certainly were quite unacquainted, and yet evidently no surplus or useless one.

Capability of Soils for continual improvement.—It is interesting to remark the capacity of all soils for unlimited improvement. The man is still living and vigorous (Mr. Mechi, of Tiptree, in England) who purchased poor land because he had no means of buying better. At the time of Dr. J. R. Nichols' visit at that farm, some six years ago, arriving there "the first of June," he found that Mr. Mechi "had already taken three heavy crops of Italian rye grass—a valuable variety—and was expecting a fourth ready for the scythe in a week!" while in Switzerland, in the month of May, the farmers "had already secured one, and in some instances two crops of grass." And the old adage, "What man has done, man can do," is never to be forgotten. And perhaps the same idea may attach to soils, or to many of them.

The committee are not in possession of sufficient data to allow them to speak with accuracy upon this point in relation to the Pickman Farm. We have nothing, in fact, running back much more than thirty years; that being about the time when a statement was published in the Society's Transactions relating to the products of this farm. Previous to that time, as we are informed, for at least one hundred years, it had been cultivated by the Pickmans, fathers and sons—the very name of whom is a guaranty for superior cultivation. The presumption, we think, is a fair one that it has been cultivated, and cropped, too, to the apparent extent of its capabilities for all of one hundred and thirty years, and yet is now far in advance of itself at any former period. What a comment on those who, after a few years of trial, sell out and "go West," or somewhere to find unexhausted land!

But the committee feel that it would be invidious to draw comparisons between the present and former years. Dr. Loring has been in possession for five years. In that time, as respects the single article of English hay, it can be said with truth, that upon the land where the grand experiment of under-draining has been made, the fifteen hundred pounds of hay to the acre has become twelve thousand. It is not pretended that all the crops have advanced in this proportion; but as a whole the state of the farm is greatly improved.

The owner is also the *dweller* upon the soil; and although much of the management is no doubt left to Mr. Ham, the superintendent, yet the owner is familiar with all the details, and may be said to direct almost all. Dr. Loring's extreme and minute acquaintance with each animal of his extensive stock, struck the committee with both delight and surprise.

A full statement relating to the buildings and fences will follow this report. We do not feel that we do justice to this farm, nor that it is possible to do it after enjoying only two visits to its hundreds of acres. It this moment occurs to us that there is a fine field, of seven acres, by the side of the road from the farm into the city proper, which was ploughed after the hay crop was taken off, and which has since been manured and laid down again, with the new grass well under way for the next year.

But enough, we think, has been said to prove our point, viz.: *That soils may be improved ad libitum*—by which is meant, like the Pickman Farm they may become *ligneous* and no longer *herbaceous* merely—that is, they may be growing upon *old growths*, and not, as is too often the case, be merely *living every spring*, to be followed with *dying every winter.* It may be true that in some departments a change of policy in farming has been pursued; as for example, less attention may have been paid to fruit and more to hay; less to one kind of root and more to another; but, as before hinted, the grand idea is that for reasons providential, and therefore sometimes beyond mortal comprehension, the resources of mother earth are found to be boundless and inexhaustible—we say sometimes beyond our comprehension; we might have put it stronger, and say it is, perhaps generally so; and yet, notwithstanding the whole philosophy of plant growth has for ages been wrapped in darkness as intense as midnight, the chemists have brought forward, within a comparatively recent period, an accumulation of important and beautiful facts of amazing signification. And the encouraging result is, these facts are not, as heretofore, lying buried beneath the crucibles of the chemists, but the agricultural world is now being blest with men who can appreciate and appropriate them. So long as gentlemen can be found, who, like the accomplished owner of the Pickman Farm, are willing to spend a part of every day actually in the field—if not literally with book in hand, yet with the knowledge of it in his head—reducing to practice great scientific truths, and watching the progress and the results, and then, like him communicating the whole without hesitation or reserve,—so long is there a bright future for the farmer.

The committee would distinctly call the attention of all who read the statement of Dr. Loring, to his remarks upon the use of sand as a manure, recollecting, however, that much of his farm is inclining to clay, or being decidedly so. In addition to the more palpable uses of the sand described by him, is the mechanical one of its uniting first with the manure itself, thus opening, dividing and making a passage through it for the rootlets long before they would otherwise find one; but also, and more especially, carrying on this important operation of dividing and pulverizing the tenacious soil itself. Look at a lump of pure clay, and imagine, if you can, how long it would take the ordinary processes of cultivation to make it productive! But sand—river sand, salt sand—will open its unwilling jaws. It is not a *manure* in itself; but it is the pioneer opening a pathway for the forces that shall make the wilderness blossom as the rose. Dr. Nichols tells us that a plant is like an infant as respects its preparation of food. It has no teeth to masticate, no salivary glands to pour out diluting fluids to render digestible its rocky aliment; it can receive it only in a liquid, soluble form. And Dr. Dana tells us that the salts and earths form *voltaic batteries with the roots of growing plants*, to be brought in contact with the "salts" and "earths" of a clay bed so as to get the benefit of the "voltaic battery," unless you first open a way for them by some process as natural and practicable as that of the freest use of sand.

But, as before mentioned, the prospects before the farmer, and consequently the county itself, are bright, and full of encouragement. When the nation's last fight is to be fought, and her last victory won, we have no possible means of foretelling; but long after that time shall have come, the triumphs of willing science over unwilling soils will be but just beginning. So long as our own county can show such farmers as Loring, and Sutton, and the Wares, father and son, and Ives, and Page,—the acting and ex-Presidents of the Agricultural Society,—with many, many others all ready and anxious to follow where our distinguished county chemist, Dr. J. R. Nichols, leads, so long old Essex may rightfully boast, not only of what it is, but of what *it is to be.* And we by no means admit that this is, as the British Reviews say, rearing a fictitious capital of renown which our posterity are to pay off; for the present generation of Essex farmers, we believe, will do a good share of it themselves.

Interesting communications to me from Mr. Rogers and Dr. Merriam, members of the committee, whose valuable suggestions I have incorporated in this report, sustain me in my views; and they urge particularly a competition among the smaller farms of the county, where the chief agricultural interest lies, for the premium of the society. With these introductory remarks I present the statement of Dr. Loring.

David Choate, *Chairman.*

Statement of George B. Loring.

The farm which I enter for premium is situated in Salem, and is known as the Pickman Farm. It contains four hundred and twenty-eight acres, lying in a body in the south-easterly part of the city. It came into my possession April 1, 1857; since which time I have added to it about seventy acres of pasture-land, lying in the towns of Boxford and Middleton, and known as Bald Hill.

The land in Salem is divided into one hundred and ten acres of cleared and cultivated fielding, thirty-eight acres of salt marsh, producing black grass, two acres of fresh meadow, and the balance of pasturing.

The surface is uneven—the pastures occupying considerable elevations of syenite and greenstone, mostly covered with not a deep soil, of a rich, warm quality, interspersed with a few small, swampy spots;—the cultivated land consisting of deep beds of clay, extending from low salt marshes to the foot of abrupt ledges, and running some distance inland between them, usually along the sides of fresh water courses, which rise in the pastures; and the salt marsh being composed of peat, lying upon tenacious clay. The level of the field, which is mostly not many feet above high-water mark, is diversified by two or three gravelly knolls, rising to the height of about thirty feet, and occupying nearly seven acres of land.

The soil under cultivation is, therefore, mostly strong clayey loam, with a heavy clay subsoil. The gravelly knolls to which I have referred, furnish, from one to five feet below their surface, beds of the finest beach sand. The farm is abundantly supplied with deposits of muck. It is well watered, both by brooks and small ponds. The natural growth of wood is the red cedar in the pastures; the walnut, red oak, elm, swamp maple, and a few pines, both hard and soft, growing upon the lower lands.

When I took possession of the farm, five years ago, I found it in a somewhat dilapidated condition. The buildings were out of repair, the orchards were decayed, and the fields were, most of them, under poor cultivation. The year previous, the crop of hay was about 150 tons of English and salt hay; 100 bushels of corn, 55 bushels of barley, 650 bushels of carrots and mangel wurzels, about 90 bushels of potatoes, 175 barrels of apples, and a few bushels of rye. The stock on the farm consisted of 46 cows, 12 yearling heifers, 2 hogs, 3 horses, 4 oxen and 1 bull. The drainage of the farm had been, for years, wholly surface drainage, ditches varying in depth from one to three feet, and beds laid up with the plough. All the clayey land on the farm was drained in this manner.

The labor which has been done on the farm, under my direction, has been devoted to thorough drainage, the restoring of the orchards, the cultivation of grass, grain and root crops, the breeding of cattle, horses, hogs and poultry, and the sale of milk.

Drainage.—Into considerable of my heavy land I have introduced thorough drainage with tiles. In a former report upon this subject, I laid before the society the plans, method and cost of draining five and one-half acres of very stiff and unmanageable clay, liable to be flooded, and always cold. Since that time I have drained other pieces of land in a similar manner, and to my entire satisfaction. The crops upon the piece referred to first have been largely increased. From fifteen hundred pounds of hay to the acre, grown, too, upon a field divided by a wide, deep, inconvenient ditch, and arranged in high beds separated by deep furrows, I have increased the yield to valuable corn, root, grain and grass crops, raised upon a smooth and even surface. Last year I raised, upon this field, ninety bushels of corn upon one acre, fifty bushels of barley to the acre on four and three-eighths acres, and a fair crop of potatoes on the remaining eighth surrounding the corn. This year the field was divided into four and three-eighths acres of grass, and one and one-eighth acres of mangel wurtzel; the grass yielded seventeen and one-half tons of the first crop, and nine and one-half tons of the second crop—making in all twenty-seven tons of hay, or six tons to the acre; and the acre and one-eighth of mangolds yielded sixteen hundred bushels. Having entered these crops for premium, I have given a more explicit statement with regard to them elsewhere. Other fields have been brought into similarly even and fertile condition by thorough drainage.

Orchards.—The orchards occupy about twenty acres. The trees are fifty years old, and were many of them imported grafted fruit. The Pickman Pippin, a very valuable cooking apple, was introduced upon the farm by Col. Pickman, in the year 1810, having been sent to him from England. The rest of the trees are Baldwins, Hubbardstons, Pearmains, Spitzenburgs, Danvers Sweets, Liscoms, and Roxbury Russets. The trees have long since passed their prime; and, when I took them, were suffering much from neglect. A system of root-pruning —practiced by digging around the tree, at the distance of five or six feet, a ditch two feet deep, cutting off about half the roots, and filling the ditch with a compost of muck and lime—

has brought the trees into good condition and bearing. I have been very careful not to cut the tops excessively—never having allowed more pruning than would clear out the dead wood and suckers; for I am satisfied that you may apply severe treatment to the root of an old tree with benefit—but you cannot cut the top liberally, either for grafting or pruning, without in a short time destroying the tree. The land occupied by one orchard I have devoted to grass crops—rye-grass, oats and barley cut green, clover, &c., ploughing it every spring and manuring it fairly; and I have found it beneficial to the trees, besides giving me as good crops as can be raised on shaded land. I would add here, what I have repeatedly stated elsewhere, that I have no faith in the profit of orchards.

Grass.—Much of my land is devoted to grass, and is peculiarly adapted to it; and every course of husbandry which I adopt is with a view to obtaining as large a supply of this valuable crop as possible. Timothy and clover grow most readily on the strong clayey soil; redtop is seldom seen, except slightly intermixed with the Timothy; and, when the latter has run its course, it is followed by a thick, heavy, not coarse growth of clover. In seeding down land which has been devoted to a series of corn and root crops, I sow my grass seed with barley, as the best grain I can find for the purpose. This is done as early in the spring as the land will admit—early sown barley being usually the best; and, by thus making a long season, I am supplied with a good cut of clover after the barley is harvested. Half a bushel of Timothy, half a bushel of redtop, and ten pounds of clover, is my rule for seeding.

When I would renew the grass, in land that is too stiff for easy cultivation—I have considerable of this—I plough after haying, generally in August, and seed it down to grass alone, using the quantities mentioned above, without the clover. In doing this I plough eight inches, with any common sod-plough, which will lay the furrow as level as possible; I then roll with a heavy iron roller: apply twenty-five ox-cart loads of composted manure to the acre; harrow with Geddes' harrow, by far the best implement for this purpose that I have ever used; brush or harrow in lightly the seed, and roll again. This process has never failed to give me a heavy grass crop the following year. Twelve acres, which last year yielded but half a ton of hay to the acre, gave me this year, under this management, three tons of excellent Timothy to the acre.

I have top-dressed a greal of run out grass land; but not with the advantage which I anticipated. Heavy lands unquestionably need stirring now and then; and light lands require frequent incorporation of manure.

Grain.—Corn and barley are the grains which I raise in any considerable quantity; on gravelly soils, a little rye, as much for the straw as for the grain. I raise corn because it is the best crop I can take from land which I propose to lay down to grass. I think grass follows it better than it does any of the root crops, potatoes included. I believe, moreover, that corn well cultivated is a profitable crop; and that corn fodder properly cured and properly fed to cattle will amply repay the cost of cultivation. Manure is spread upon the surface of my corn land and harrowed in; and a little super-phosphate of lime or ashes, the former placed in the hill, and the latter applied at the first hoeing, generally gives abundant crops.

The field appropriated to corn this year contains about fourteen acres. It is rather low, and intersected by a small brook. On one side of this brook the land is clayey and heavy; on the other it is a mixture of sandy and clayey loam, strong and warm, in some places presenting the appearance of having been washed from the surrounding ledges by heavy floods, and all interspersed with small shallow deposits of decayed vegetable matter. Last year this field yielded a very small crop of hay—not more than half a ton to the acre. Its surface was broken by boulders, and by a knoll covered with red cedars, bushes, and stones. In September of last year it was thoroughly cleared of stones and trees; new ditches were dug; an elevated spot of about three-quarters of an acre, very springy, was drained with tiles; and the whole field was ploughed eight inches in depth. From a deposit of muck in one corner of the field, five hundred loads were drawn and deposited at proper distances from each other, in heaps of about one hundred loads each. Late in the autumn twenty casks of lime were mixed with each heap. A hundred loads of barnyard manure were drawn into the field during the winter. In the spring the compost of muck and lime was spread evenly upon the land, and harrowed in with Geddes' harrow, heavily weighted. The land was then lightly furrowed; a small quantity of super-phosphate placed in each hill—on a portion of the field the barnyard manure was also used in the hill—and the corn was planted from May 24 to May 30. During the summer a few spots suffered from water, and larger patches were destroyed by the wireworm. But where the corn escaped these evils, its yield was seventy-five bushels to the acre; and the fodder was very heavy. A portion of the field, which contains in all sixteen acres, was planted with potatoes and cabbages.

The whole expense of clearing this land and preparing it for the corn crop was as follows:—

In October, 1861, with 8 men and 4 yoke of oxen, 144 days' work,	$144 00
Blasting boulders, 10 days' work,	12 50
Lime,	55 00
Tiles,	12 00
Composting lime and muck, 15 days,	14 00
Ditching, spreading compost and harrowing in spring, 1862, 30 days,	40 00
	$275 50

After this the expense was what usually attends raising the corn crop.

Of the small grains, barley is to me the most profitable. My land yields readily fifty bushels to the acre, when it is in condition to be seeded down to grass. Barley always finds a good market, and the straw is valuable fodder for store cattle.

Root Crops.—It is not proposed to discuss here the value of root crops. It is enough to say that I have raised from four to seven thousand bushels annually for the last five years—last year sixty-five hundred bushels—this year forty-three hundred and twenty-six bushels. The roots raised are the mangel wurzel, carrot, ruta-baga and English turnip. The seed used for the last four years has been imported by the Massachusetts Society for Promoting Agriculture. For mangel wurzel, strong, rich, clayey loam is best, manured with eight cords of barnyard manure, well rotted, to the acre, about as much more applied in the drills, with the addition of twelve or fifteen bushels of refuse salt. The seed should be soaked thirty-six hours before planting, the water being hot when poured upon it; and it should be dropped by hand and covered with the hoe. It is very seldom that a machine will drop and cover mangel seed in such a way as to secure an even crop. A strip of plank four inches wide and three feet long, from the lower side of which one and one-fourth inch pins project two inches, with spaces of seven inches, applied lengthwise on the top of the drill by means of a light frame handle, is a convenient implement for making the holes into which the seed is to be dropped. This avoids the labor of thinning the plants, and enables the cultivator to cover the seeds at a uniform depth. Mangel wurzel are raised almost exclusively for my milch cows—a few being fed to store hogs. They should be sowed by the 20th of May.

Carrots are raised on rather warmer, lighter land, enriched with rotted barnyard manure, ten cords to the acre. The land is ploughed twice, raked smooth and rolled lightly. The seed is sowed by machine, in rows from ten to thirteen inches apart. I prefer the short orange, as the soundest and heaviest root; the crown being very large and the point thick. It is more easily harvested, and does not lose in weight like the long orange, the long tap of which is apt to wilt after being kept three or four months in the cellar. I sow carrots as soon as the ground becomes warm in the spring. I raise them for my horses; having found them to be an expensive root, and of small benefit to my milch cows or store cattle. My crop this year was six hundred bushels on ninety rods of land.

Ruta-bagas require lighter land and less manure than either of the before mentioned roots. The best crops I have ever had, were raised on new gravelly soil, ploughed about six inches, enriched with about four cords of manure harrowed in after ploughing. Roll the land lightly, and sow the seed with machine. In this way a solid, smooth root may be raised. On old land ruta-bagas make long necks and rough bodies. They are the cheapest root raised, and the most valuable for store and fatting cattle. The seed I use is "Skirving's King of the Swedes," imported by the Massachusetts Society. In order to avoid the ravages of insects, and to prevent the root from being overripe in the autumn, sow ruta-bagas about the 20th of June.

Potatoes.—The potatoes raised on the farm were all planted on new land—a small portion on the cleared field referred to, and the remainder on pasture-land cleared for the purpose. The latter had no manure, except a handful of plaster in each hill. The seed was Jackson Whites, and an excellent potato brought from Maine by my foreman. Those raised in the pasture-land were smooth, of uniform size, very mealy, equal to the Chenango in its best days. The yield was a bushel to twenty-two hills.

The *cabbages* raised were the late Savoy and Drumhead, planted on new land, manured with barnyard manure in the hill.

The land occupied by the crops referred to was as follows:—Barley, five and one-half acres; corn, fourteen acres; potatoes, four acres; mangel wurzel, one and one-fourth acres; ruta-baga, two and one-half acres; carrots, ninety rods; rye, one and one-half acres; rye-grass, two and one-half acres; cabbages, one-half an acre; corn fodder, one acre; kitchen garden, one-half an acre; making the land devoted to crops, thirty-three and three-quarters acres.

Of English grass there are seventy-seven acres.

The amount of crops raised on the farm this year is as follows:—

English hay,	165	tons.
Second crop, (a large part being fed on the land in the autumn,)	15	
Salt hay,	40	
Rye-grass,	8	
Barley straw,	28	
Corn fodder,	40	
Amount of fodder,	298	tons.

Ruta-bagas,	1,876	bush.
Mangel wurzel,	1,800	
Carrots,	600	
Potatoes,	400	
English flat turnip,	50	
Barley,	250	

Rye,	40	bush.
Indian corn,	500	
Cabbages,	3	tons.
Apples,	600	bbls.
Cider,	80	

In addition to these, were raised garden vegetables sufficient for my own family and that of my foreman.

The stock on the farm consists of:—

Cows 50, including two-year-old heifers that have calved; yearlings, 12; calves, from four to ten months old, 14; two years' old steers, 2; oxen, 4; bulls, 2.

Horses for work, 3; breeding mare, 1; four-year-old colts, 3; three-year-old colts, 2; yearling colts, 2; sucking colt, 1; stallion, 1; driving horses, 2.

Swine, fatting and stores, 14; breeding sows, 3; sucking pigs, 15.

The cows, heifers and calves are mostly pure and grade Ayrshires; all bred by myself, except twenty, of which six were imported and fourteen were purchased in the market. I selected this breed, after having satisfied myself that they will make more milk out of a given amount of food than any other cattle—that they are hardy and well adapted to our soil and climate, and that they fatten well, when fed for the shambles. The two-year-old steers enumerated are grade Ayrshires, twins; and they are well shaped, vigorous, and of good size. The bulls are both Ayrshire—Irvine, imported by the Massachusetts Society, and Allard, by Essex, out of an Ayrshire cow imported by Hon. Joseph S. Cabot, of Salem.

The stallion, one driving horse and six of the colts are of the Black Hawk family, through Trotting Childers.

The swine are a cross between Chester County and Suffolk; they reach great size, from four hundred to six hundred pounds, feed easily, and cut well; often six inches over the shoulder.

The poultry are—fifty hens, a mixture of Black Spanish and Game, hardy, heavy fowls, and good layers. They carry great thickness of fine grained meat on their breast. The English game cock, either the Derby or, what I now have, a bird from Lord Berwick's breed, is pretty sure to improve any flock of hens with which he is mixed, always excepting the coarse East India fowls, which persist in being *sui generis*. Thirty turkeys, a mixture of bronze from Worcester County, and the Canada; a solid bird, in weight midway between these two breeds. Twenty ducks, a breed brought from England, whose name I have been unable to ascertain.

The buildings on the farm are—one barn 42 by 114, with manure cellar and root cellar occupying all the space beneath. In this barn the milch cows, oxen, one bull and the farm horses are kept. Hay is stored in it in bays and mows, and on a shifting mow over the drive-way, reaching from the mow-beams to the ridge-pole. Another barn, 32 by 100, arranged in a similar manner, where dry cows and young cattle are kept. This barn has an L attached, 18 by 52, containing stalls and boxes for breeding mares and colts, with a hay loft. This barn and the L have cellars under them. There are, also, a corn-house, 16 by 20, a cider-house, carriage-house, hen-house, hog-stye, wood and cart sheds, and farm-house. All the barn cellars are stone-walled on three sides, and closed in front with boards; three wide double doors admitting to each cellar.

Water is brought to the farm-house, barnyard and largest barn by a hydraulic ram.

Manure.—All the manure used on the farm is made on the premises, and last year amounted to about one thousand loads. I use in composting, muck, sea-weed, clearings from salt marsh ditches and sand. The turf or sod cut from salt marshes, which is usually so tough as to defy all decay, may be disintegrated by placing it in the barn-cellar in winter, when it is frozen and covered with ice, burying it with manure, thus preventing its thawing too soon, and forking it over when the weather becomes warm. It then comes to pieces, mixes readily with the manure, and forms an excellent compost. In working sand into my manure I use it as bedding for my cattle and horses not at work. It keeps them free from vermin, prevents barn itch, makes a comfortable bed for them, absorbs all ammonia, and keeps the buildings free from smell, and forms a most valuable addition to the manure applied to my clay lands. It is easily worked, and requires but little handling compared to muck. It prevents manure from heating, and on this account is most useful to combine with horse manure. It cannot be recommended too highly to all who have heavy lands to cultivate.

The sales from the farm, during the last year, have been: milk, 60,912 quarts; apples, 400 barrels; cider, 75 barrels; vinegar, 200 gallons; ruta-baga, 130 barrels; potatoes, 50 barrels; barley, 200 bushels; pork, (2,000 pounds now on hand,) 1,500 pounds; pigs, 12; calves, 30; heifers, (fat,) 2; cows, 20; bulls for breeding, 2; colts, 2.

The labor is performed by a foreman, milkman and eight laborers in summer, and three in winter.

In addition to the milk sold, enough is reserved for the families of myself and my foreman, and to make butter for my own family nine months in the year.

The food for the milch cows is English hay, usually chopped fine and mixed with meal or shorts three times a day, and mangel wurzel, about half a bushel, once a day. A portion of the time they are fed on corn fodder, chopped and mixed with cob-meal. During nearly the whole winter all the food, with the exception of the roots, is prepared by steam, for which purpose I have a movable tank in each barn, connected by long pipes to a steam-boiler. The young cattle and dry cows are fed on straw, black grass and corn fodder, with very little corn meal, also prepared by steam, and a peck of ruta-bagas per day.

I have given a hasty sketch of the farm and its operations, leaving it to every practical farmer to enlarge upon such suggestions as may appear of value to himself, and apply them to his own locality, according to circumstances.

A chief part of the success of a farmer who relies on others for his labor, depends upon the skill, and accuracy, and economy and judgment with which his foreman carries out his plans, and perhaps improves on them. And I should be guilty of an act of injustice did I not remind the committee that wherever my designs have been put into practical operation, I am under obligations to Mr. Elias Ham, my foreman, who discharges his duty in such a way as to show what it is to fulfil faithfully that most difficult of all offices, farming for another.

MIDDLESEX.

From the Report of the Committee.

The whole number of entries for premiums was three; much less than we expected to find. Sometime before we made our final examination of the different farms, we prepared and sent to each competitor a list of questions to be answered in their statements, which will be found in connection with the same hereto annexed.

In making our examinations and awards, we started with the idea that to be entitled to a premium, the farm must show conclusive evidence of permanent and judicious improvements recently made, and at a moderate and reasonable expense, with good and thorough cultivation, neat and tidy appearance about the farm and buildings, serviceable horses, oxen and cows, the carts, wagons and tools in good repair, with proper and reasonable answers to our questions.

We first proceeded to examine the farm of Mr. Joseph A. Harwood, of Littleton. His farm contains about 150 acres of land, pleasantly located on the road from Littleton to Boxborough. The upland is mostly a strong, rocky soil, well adapted to fruit, of which there is quite a thrifty young orchard just beginning to bear, and an older orchard now in its prime. The young orchard is thrifty and growing quite fast, but has not been, in the opinion of your committee, very skilfully trimmed—the limbs branching out very much too low; they are also planted too near each other, some of them being not more than twenty or twenty-five feet apart, and the limbs now nearly touch, although the trees have only been planted ten years.

There is also a peach orchard, containing six hundred trees, planted two years ago, in an old worn-out pasture, in the following manner: About six furrows were back-furrowed together, and upon these furrows, at a distance apart of about twenty or twenty-five feet, were planted peach trees, and two rows of potatoes. Then, at a distance of twenty-five feet, and parallel to the first row, a second row was prepared and planted in the same manner; and so on, until the whole piece was completed. These trees have now a feeble look, and have not grown much the present year, although it has been a favorable season for trees in such a locality, and they evidently need a more thorough culture.

Mr. Harwood has reclaimed, at different times during the last ten years, eight acres of meadow, upon which he raises large crops of grass, which is quite an improvement, and helps materially to fill his fine new barn. A little more draining could be easily done here to great advantage. The other improvements consist in relaying and making a large quantity of new wall, improving the pastures, and the last year building a fine and substantial barn, which is very conveniently arranged.

The only hoed crops on the farm were some three acres in the orchard, planted mostly with corn, and a few carrots and potatoes; this did not show clean culture.

A good house would appear to be a very necessary appendage to a farm, and without one no farm can be perfect. The one Mr. Harwood occupies belongs to his mother, but will probably become his at some future time. His stock of horses and cattle looked well.

Mr. Harwood's improvements sum as follows: he has built a fine barn, reclaimed eight acres of meadow, planted a large number of trees, built a large quantity of stone wall, and improved his pastures.

We next visited the farm of Mr. Abiel H. Wheeler, of Concord, who is considered a very skilful farmer. The lot upon which his buildings are situated contains about twenty-five acres of land. Most of the soil is a sandy loam, rather moist. Upon this lot there does not appear to have been any material improvements made within the last fifteen years, except planting quite an orchard of apple trees, some ten or twelve years ago, and an asparagus bed of one and one-fourth acres, which is also planted with apple trees, and on the back part of the lot substituting a few under-drains in the place of open ones.

The apple trees on the asparagus bed are very thrifty, making a very large growth. Part of the others are in good condition, though many of them are suffering from some cause unknown to your committee. The asparagus, corn and other crops, show good and clean culture—the apple trees, evidence of injudicious pruning, in the large cankered spots where trimmed.

Upon this lot Mr. Wheeler has a good house, a barn one hundred feet long, with cellar under it, a young apple orchard, a few pear trees, and small fruits sufficient for the use of his family.

We then visited the lot on Fairhaven Hill, some three-quarters of a mile from the house. This lot, or a portion of it, twelve or fifteen acres, has recently had the wood cut off. Mr. Wheeler has ploughed it, subdued the brush, planted it, and now has it in grass. After it is well fenced it will probably make a decent pasture, but it is at too great a distance from the home place for convenience.

Mr. Wheeler's stock of cattle, among which he claims to have a number of full blood Ayrshires, looked well, and were in good condition, so far as we saw them.

Mr. Wheeler's improvements are as follows: He has planted an apple orchard, an asparagus bed of one and one-fourth acres, substituted some covered for open drains, and converted a piece of land recently covered with wood, to pasture.

We next visited the farm of Mr. Samuel Hartwell, of Lincoln, located on the road from Concord to Lexington. This farm contains about fifty acres, a large portion of the land having been leased to different tenants for several years previous to the time it was purchased by Mr. Hartwell. The soil of the upland is a gravelly loam, bountifully supplied with many large and small stones, and would be called a hard land to cultivate, but is particularly well adapted to fruit, of which there are six acres of young apple trees, just commencing to bear. Many of these trees were loaded with very large and handsome apples, and some had a heavier crop on them than we have seen elsewhere, even in this abundant season. There is also a good brook meadow, which produces large crops of stock hay, a few acres of bog meadow, a portion of which has been ploughed, and now has growing on it a good crop of potatoes; also a few acres of low land, producing grass.

Mr. Hartwell, as will be seen by his statement, grows various crops, which he sells in Boston; and, as he understands how to grow and put up his articles in good shape, he undoubtedly receives for them a remunerating price. His hoed crops showed good culture, and were in a pretty fair and clean condition as to weeds. The general appearance of the farm was good; the walls around the different lots were mostly free from brush. Upon the land first purchased by him, are located the buildings, which consist of a good substantial house, when first purchased very much out of repair, and two old barns, then not very convenient, but now in good comfortable repair. Every thing about the house and barns seems to be kept in a neat and orderly manner.

The improvements that have been made are repairs on the buildings, rebuilding and removing walls, planting fruit and ornamental trees, draining lowlands and uplands, and increasing the general productions of the whole farm, all of which has been done within five years.

Mr. Hartwell is a very energetic young man, and undoubtedly would accomplish as much as any one on his place with the same means. His answer to question No. 25 is very explicit and satisfactory. While Mr. Harwood does not answer the question except as to net profits, he gives his income and expenditures, but does not state what his income is from ; and for aught we know, it may be the result of speculations in stock, real estate, or income from some other source than the farm.

The answer given by Mr. Wheeler to the same question, shows for receipts $2,190 ; for expenditures, $180 ; to which there is a note added, stating that he has sold wood sufficient to cover the other expenses, such as groceries, tools, blacksmith bill and repairs of various kinds. Now it is certainly very convenient to have eighty-eight acres of woodland to pay expenses with, but such a reply does not afford us any light on the subject, or answer the question proposed. It seems by his statement, that there has been only twenty dollars expended for the general work on the farm, and fifteen dollars for the special object of digging drains during the past year. He also states that he has worked on highways, and away from the farm, to the amount of forty dollars, which would convey the impression to the reader that he has received five dollars for labor more than he has paid out, and at the same time and with the same labor, secured the whole crop of his farm, amounting to $2,190, and cut and teamed all that wood to pay bills with besides. But the facts are probably, that, in addition to his own work, his sons, who are of age, have done a large amount of labor, which would have cost him quite a sum of money, and should have come into the estimate ; otherwise, the statement on the face of it is absurd. In fact, he has since informed one of the committee that his sons have worked considerable on the farm during the last year.

In making our awards, we have endeavored to keep in mind the object of the society in offering the premiums on farms; one of which is an accurate, clear and full statement of the receipts from the various crops and products of the farm, separately, and also the entire expenditures of the production of the same; so that when printed in the society's Transactions, they may be read with profit, and be instructive to the reader.

While all the competitors have made improvements on their farms creditable to themselves, the statements of two of them are not full enough to warrant the committee in awarding to them the society's premium. Mr. Wheeler says, in answer to question No. 24, that he keeps a journal of his farm operations, and not only keeps a debt and credit account with himself, but also with all that he deals with. If this is so, he certainly had no occasion to answer the next question in so vague and unreliable a manner.

JOHN B. MOORE, *Chairman.*

[The following is the list of questions, mentioned in the preceding report, required to be answered by competitors.]

1. Of how many acres does your farm consist, and how long have you owned the same?

2. What was the condition of the land and fences—was the former in a good state of cultivation, or otherwise?

3. What was the proportion of tillage, pasture, meadow and wood?

4. What amount of hay and grain did you raise then, and what amount now?

5. What varieties of grain do you raise?

6. What roots do you raise?

7. Do you feed them to stock or sell them?

8. At what time do you seed land to grass, and how much, and what kind of seed do you use?

9. Do you apply top-dressing to grass land—if so, at what time?

10. How do you apply manure to tillage land—composted or not—ploughed under (if so, how deep,) or on the surface—and what quantity per acre, estimated by the cord?

11. Do you use any guano or special manures—if so, how applied, and with what results?

12. What course do you pursue in draining—open or covered drains—how made, and the cost per rod?

13. To what depth do you commonly plough your land?

14. Have you reclaimed bog meadow or wet lands—if so, state the method?

15. Have you made any experiments in improving pasture lands, by killing the brush or otherwise—if so, state the process?

16. How much live stock do you keep, and what breeds?

17. Do you use oxen or horses to do the team work on your farm, and which do you consider the best and most economical?

18. Do you raise swine—if so, is there any profit in it, and what breed do you keep?

19. Do you consider the cultivation of a garden essential to a farm?

20. What fences are the best and cheapest on your farm?

21. What fruits do you raise, and what extent of orcharding have you of the different kinds?

22. State the distance, one from the other, that you plant your trees, the method of cultivation, the kinds of crops raised in the orchard, and what means you employ to prevent the ravages of the borer and other insects.

23. State particularly the improvements made for the last five years on your farm.

24. Do you keep a journal of your farm operations?

25. State the amount received for the various crops raised on your farm, separately, the cost of labor, manure, and other expenses, and the net profits for the present year.

26. Have you kept sheep—if so, with what success?

27. What experiments, if any, have you made in raising any crop, and the result of the same?

28. Give any other information, not generally known, that you may possess about agriculture or horticulture.

Statements of Samuel Hartwell in answer to Questions.

1. My farm consists of fifty acres, a portion of which I have owned five years, the remainder four.

2. The condition of the land and fences was generally good, and a portion was in very good heart.

3. There were about forty-seven acres of meadow or grass land, one acre of tillage, and two acres of newly ploughed land.

4. At the time I purchased my farm, I raised about forty tons of hay—no grain. At the present time I raise about the

same amount of hay, and from two to five acres of oats or barley cut for fodder.

5. Oats and barley, only for fodder.

6. Potatoes, carrots, ruta-bagas and white flat turnips.

7. I usually do both—if they sell well, sell most of those that are suitable.

8. I have seeded my land to grass in the spring, using Timothy, redtop and clover, in the following quantities respectively: one-fourth bushel, one-half bushel, and from eight to ten pounds of clover, until this year, when I used three-eighths of a bushel of Timothy and three-fourths of a bushel of redtop, but no clover.

9. Do not.

10. I apply manure in the form of compost, except on muck land, sometimes spreading and ploughing it under to the depth of six or eight inches, sometimes in the hill, and sometimes both, from six to eight cords per acre.

11. I once used some of the Lodi Manufacturing Company's poudrette on muck land, for potatoes, but did not think very highly of it, although I think it might be valuable for early crops, such as sweet corn, pease and vines, to give them an early start—some other manure is needed for the crop.

12. On muck lands I use the open drain, about four feet wide at the top, three at the bottom, and five feet deep, at a cost of about forty-five cents per rod. On upland I dig a trench about three feet deep, lay an open culvert on the bottom, then fill with small stones to within about ten inches of the surface, and cover with soil—considering the cost, in my case, not much more than the digging of a trench, as it makes a convenient place to remove the small stones, which were quite plenty near the place I wished to drain.

13. About eight inches.

14. I have at present about one and one-fourth of an acre of wet land, planted with potatoes, which was ploughed three years since, early in the spring, when the ground was frozen to a great depth, and the sun had thawed some four inches on the surface, just enough to relieve the grass roots. With a sharp plough it tore up very readily, the oxen walking on the frost beneath.

15. I have no brush pasture to clear.

16. I have kept from twelve to twenty head of cattle in the winter, sending them into the country in summer. Breeds, mostly native, some Devon.

17. Always keep oxen to do my heavy work. It depends upon the land to be cultivated, which is the most economical. If very stony, I should prefer oxen—if not, horses. I am not fully decided which would be the most economical on my farm.

18. Always keep swine, but do not raise them—am not particular about the breed, if they are well formed, and will work well. I think there is a decided profit in the manure they make.

19. If a man does not cultivate garden vegetables in the field, so as to have a good variety, I consider a garden essential.

20. Stone walls and ditches.

21. My principal fruit is apples, of which there are about six acres of young trees, most of them just commencing to bear. I have a few pears, currants, raspberries, &c., for family use.

22. Apple trees should be set from thirty to thirty-three feet apart, at least. I plant standard pear trees twenty-five feet apart. When young trees are set, great care should be taken to have them set the right depth, and to have the holes sufficiently large, cutting off from one-third to one-half of the last year's growth, to correspond with the roots that have been cut. An orchard should never be in grass more than two years at a time; if it is, the fruit becomes small and unfair, and the trees lose their thriftiness. I have no particular crop for an orchard, but cultivate most any of the field crops, as the case may be. The only insect that has troubled my fruit trees to any great extent, is the caterpiller, which I destroy by taking them from the tree, as soon as hatched, with my hand.

23. Some of the improvements made, have been repairs on buildings; removing stone walls and foundations of walls, and building anew, to inclose unfenced lots and improve the shape of others and add to the general appearance of the farm; setting out shade and fruit trees, where they were needed; draining and reclaiming wet land, and draining upland.

24. Only in my head.

25. The amount received for my principal crops, for the last three years, was as follows:—

CROPS.	1859.	1860.	1861.
Pease,	$132 39	$143 34	$129 86
Sweet Corn,	110 21	98 68	118 16
Pickles,	174 03	228 75	270 68
Squashes,	62 83	23 49	44 07
Potatoes,	19 58	160 86	47 31
Turnips,	55 67	78 14	57 33
Carrots,	13 87	30 00	38 75
Apples,	67 60	96 58	4 20
Pork,	38 56	40 00	70 20
Milk,	450 58	238 90	280 70
Hay,	256 03	283 78	250 00
Calves,	117 50	78 36	14 00
Small fruits,	25 00	20 00	–
Totals,	$1,523 88	$1,520 88	$1,325 26

Corn raised and used in 1859, 100 bushels ears; in 1860, 350; in 1861, 325.

Allowing $11 per month for board of help, my expenses have been as follows:—

	1859.	1860.	1861.
Help,	$280 50	$327 00	$417 00
Taxes,	30 00	40 00	30 00
Pasturing cattle,	47 50	35 00	43 50
Manure,	30 00	16 50	37 00
Totals,	$388 00	$418 50	$527 50

My own labor and the expenses of my family, are not included, nor the milk and vegetables used. My horse, oxen, and dairy stock have also had their living from the farm.

The net profit for the present year cannot be accurately stated, but, by request of the committee, I make the following estimate:—

By Pease, sold, 90 1-3 barrels,	$230 12
Sweet Corn, sold,	113 72
Pickles, sold, 125,000 at $1.25 per 1,000,	156 25

By Squashes,		$35 00
Potatoes, 100 barrels, at $1.25 per barrel,		125 00
Turnips, 250 barrels, at 75c. per barrel,		187 50
Carrots, 6 tons, at $10 a ton,		60 00
Apples,		100 00
Pork, 1,200 pounds, at 6c. a pound,		72 00
Milk,		100 00
Hay, 40 tons, at $12 per ton,		480 00
Calves,		125 00
Small fruits,		20 00
Corn, 300 bushels ears, at 35c. per bushel,		105 00
Corn fodder, 6 acres,		100 00
Oats, 4 tons,		40 00
Total estimated income,		$2,049 59
To Help,	$440 00	
Taxes,	60 00	
Pasturing cattle,	45 00	
Manure,	50 00	
Keeping horse and oxen,	300 00	
Keeping cows,	200 00	
Cost hogs and keeping,	72 00	
Total estimated expenses,		$1,177 00
Estimated profit,		$872 59

My own and family expenses should be deducted from the final balance. The price credited to the several articles is supposed to be the market price, whether that market is at home or in Boston.

26. Have never kept sheep.

27. My experiments have usually been in the amount of manure applied; the result, the more manure the better the crop. The best articles, rightly put up, find the earliest market, and command the highest price.

Statement of Joseph A. Harwood.

1. My farm consists of 150 acres; have owned it twelve years; am the fifth generation of the family who have owned it.

2. At the time it came into my possession, it produced twenty-five tons of hay, seventy-five barrels of apples, and wintered

sixteen head of cattle and horses, yearly. The fences were old walls, rather low, and ornamented with considerable brush. None of the meadow land was reclaimed.

3. Of meadow, about ten acres; wood, forty; tillage, fifty; pasture, fifty.

4. I then cut twenty-five tons of hay; I now cut sixty-five tons. Of grain, I raised about the same then as now.

5. Indian corn, wheat and oats.

6. Carrots and potatoes. I consider carrots a valuable crop.

7. I feed carrots to all kinds of stock, including hogs, but sell the potatoes.

8. I seed most of my land in the spring, using eight quarts Timothy, one bushel redtop, eight pounds clover.

9. I top-dress my grass generally in the month of September. I consider it a great loss to spread it in the spring.

10. Composted and uncomposted, and ploughed under to the depth of six inches.

11. I have never bought a dollar's worth of manure of any sort, and do not think a farmer in this locality can afford to, or needs to.

12. I have made several miles of drains, both covered and uncovered, preferring the latter, that cost me twenty-five cents per rod, the mud more than paying it.

13. About eight inches.

14. I have reclaimed eight acres of meadow land, with admirable success, in the following manner:—

After draining the land thoroughly, I spread on, in winter, three or four inches of gravel, and then a coat of horse manure, doing nothing more, neither sowing any grass seed, nor disturbing the old sod. The first year I obtained a heavy crop of weeds and grass, but the second year, and ever after, by top-dressing once in three years, I get from three to four tons of clear English grass. The reward for the labor upon this piece of land is greater than upon any other I ever worked. Before I reclaimed these eight acres, the grass was repeatedly sold for the sum of five dollars. You will please notice the cost of reclaiming this meadow has been slight, having had one man, with a pair of oxen, gravel and manure an acre in fourteen days. One crop alone has paid the expense.

15. I have, by ploughing and planting.

16. I winter forty head of horses and cattle, about an equal number of each. The horses are mostly taken from the city to board, thereby enabling me to sell all my hay at a good price in the barn, and have the benefit of it besides; one ton thus disposed of is the means of producing two tons the next year. My cattle are of the Durham breed, and great milkers.

17. I use both oxen and horses.

18. I do.

19. I do.

20. Stone walls.

21. I raise apples, peaches, pears and cherries. Of apples, I have seven hundred trees, mostly Baldwins, raised by myself from the seed—six hundred peach and fifty pear and cherry trees.

22. I set my apple trees thirty feet apart, and plant potatoes and corn among them, preferring the former to any other crop. To keep off the borer, I have, for the last five years, practiced placing wood ashes around the body of the tree. I have not lost three trees from the borer, or any other cause, during the whole time. I consider this method effectual. I do not trim my trees to excess; the best time to trim them is when you can; although I prefer June to any other month, and try to do it then.

23. I have reclaimed eight acres of meadow, and twelve acres of brush pasture, laid four hundred rods of stone wall, set out five hundred apple and six hundred peach trees, increased my hay crop from twenty-five to sixty-five tons, my apple crop from seventy-five to three hundred barrels, and built a substantial barn, one hundred feet long, and forty feet wide, with a cellar under the whole, and a wing forty by fourteen feet.

24. I do.

25. For the last four years, I have kept an exact account of all my expenses and income, being particular always to reckon with the expenses the interest on the value of the farm. On referring to my books, I find for 1859, $844.60 net profit; 1860, 114.73. This year erected a building at a cost of $250. In 1861 I built a barn at a cost of $1,690.37, and my expenses exceeded my income $811.55. My books are at your service. The help

which I keep upon my farm consists of one man twelve months, and two men eight months.

26. I have not.

27. I have made some very satisfactory experiments with meadow mud, and with manure. Without going into detail, I will state, in a general way, the conclusion I have come to—that the exposure of manure, when placed in heaps, or spread broadcast to the sun, air and frost, does not injure it, but, on the contrary, is a benefit; that mud is a great fertilizer on all high lands, especially if they are gravelly, but the mud must be thrown up, and exposed to the air and frost a year before using, in order that the green vegetable matter contained in it may become pulverized.

LITTLETON, September 29, 1862.

Statement of Abiel H. Wheeler.

1. My farm consists of one hundred and fifty acres, a portion of which I have owned thirty years, and the remainder came into my possession quite recently.

2. A portion of my farm produced what would be termed a middling crop; some was old worn out land, having been cropped without succession, and quite a number of acres of low swampy land, covered with maple, birch, dogwood, and other kindred brush, were filled with large white pine stumps; and another portion was low boggy meadow, filled with stumps, skunk-cabbages, and other worthless products. The fences were generally poor.

3. Tillage, twenty-six acres; pasture, twelve; meadow, twenty-four; woodland, eighty-eight.

4. Hay, thirty tons; rye, ten bushels; oats, thirty; corn, thirty; potatoes, forty. 1862, hay, seventy-five tons; oats, fifty bushels; corn, one hundred; potatoes, two hundred; roots, three hundred.

5. Corn, wheat, rye, oats and barley.

6. Ruta-bagas, sugar beets, carrots and flat turnips.

7. The best smooth ruta-bagas I sell, but feed all other kinds to my stock.

8. I seed land to grass in April, May, June and September; sow eight pounds of red clover, ten quarts of Timothy, and one bushel of redtop per acre; and in the spring, when the snow is

leaving the ground, I plough, and sow from six to ten pounds of red clover.

9. I apply top-dressing in the months of October and November, spreading out of the cart.

10. I apply manure, in all cases composted, to tillage land, if the land is low, putting it on the surface and harrowing it in; if the land is high, I spread from six to ten cords per acre and plough it in. The compost consists of one part solid manure to two parts soil or muck.

11. I formerly used special manures, but of late have used them in small quantities, and am fully convinced that it is best for me to have nothing to do with them in future.

12. I prefer open drains for the main ones, but for the smaller, use tile, having them covered. Last year, I commenced digging drains, from three to five feet deep, on a piece of four or five acres of low boggy meadow, between the high and low land, and, as the subsoil was loose, laid strips of board on the bottom, placing the tile on the board, and covered it with leaves from the forest, before putting in the soil. I should set the cost of the tile drains at twenty cents per rod.

13. Ten or fifteen years ago, I ploughed from nine to twelve inches deep, but for the last five years, from seven to nine inches, being governed somewhat by the depth of the soil, and the location of the land. I think that seven inches is deep enough to plough low bog-meadow, and nine inches, high sandy land.

14. I have reclaimed from fifteen to twenty acres of low, swamp and bog-meadow land. On a bog-meadow, my first operation is to drain thoroughly, if possible; then cut off smooth all the hassocks and brakes and cast them into a heap on the high lands; then remove three feet of the surface soil seven inches deep, on the side that I wish to commence ploughing; then carry all the furrows, using the team as I find the land—soft or hard; after ploughing, I commence with the harrow, going each way until the land is made smooth; then apply the compost, ten cords per acre, when it is spread and worked in, and the land is ready for grass seed.

15. I have reclaimed from twelve to fifteen acres of rough, rocky hill land, commencing with the axe and brush scythe; then, after burning the brush, with the aid of a good plough

and ten strong oxen, I came off victor over shrub oaks, grey birches and other attendant brush, and with a strong harrow, smoothed the surface, gathering large quantities of roots and stones. I then planted the lot with potatoes, and the following year with barley and grass seed, with good results.

16. I winter from twenty-five to thirty head of cattle and two horses. I have some full blood Ayrshires, and a number of grade stock. I prefer the Ayrshire to fill the milk cans.

17. I use horses mostly for my farm work, and for farm purposes consider them the cheapest and best; but, if I have an old brush pasture to plough, or an old bog-meadow to subdue, prefer oxen.

18. I seldom raise swine, considering it cheaper to buy when part grown; if there is any profit in keeping them, it is in making manure for the barn-cellar. I keep no distinct breeds.

19. I think that every one should have a good garden and take care of it, and raise a good supply of all kinds of vegetables for his family; beyond this, I do not think it is profitable for persons so far from a good market as Concord.

20. Where stones are plenty, I think they are the cheapest and best, especially for division fences; but where we wish to remove them often, I prefer holed posts and rails of good size, three or four rails high.

21. Apples, pears, grapes, strawberries, currants and raspberries; I have about four hundred apple and sixty pear trees.

22. I set my apple trees thirty feet apart, and my pear trees twenty feet each way; many of them are standard stock. I have one and one-fourth acres of an asparagus bed that is set with apple trees, sumptuously fed by the dressing that the asparagus receives from year to year; some trees among hoed crops, where they are liberally manured, and others in different locations. I purpose from week to week, as the fruit falls, to gather it, in order to destroy all the worms I can.

23. One improvement is the care and management of my orchard—pruning and other attendant requirements, and setting varieties of pears. Another is the addition of four acres of low, worthless bog-meadow—filling it with blind drains; also, the addition of tile drains to other parts of the farm; also, an addition of twenty acres of pasture, thirteen acres of which was mostly filled with shrub oak and grey birch, now a great benefit

to the farm, having produced two bountiful crops per year for the last two years. Another improvement is adding to my stock a full blood Ayrshire bull. By this means impregnation goes on from year to year, which is, I think, a decided advantage to the native cows.

24. I keep a journal of my farm operations; also, a debit and credit, not only with myself, but with all who deal with me.

25. By asparagus sold,	$450 00	
milk, for last 12 months,	450 00	
hay, value present year's crop,	775 00	
potatoes and root crop,	175 00	
apples and pears,	100 00	
poultry and eggs,	75 00	
corn,	75 00	
oats,	50 00	
work on highway, &c.,	40 00	
Total,		$2,190 00

The income of my flower-garden I cannot estimate in dollars and cents; the pleasure obtained from it is of more worth than gold. This is under the particular guidance of Mrs. Wheeler.

To boy, for four months' labor,	$20 00
Irishman, for digging drains,	15 00
Super-phosphate, two bags,	5 00
War and other taxes,	65 00
Other expenses, in part not specified,	75 00
Total,	$180 00

The wood sold covered other expenses, such as groceries, blacksmith bill, tools and repairs of various kinds.

I buy my molasses and sugar in large quantities in the right time, and by so doing make a saving of twenty-five per cent.

26. I never kept sheep.

27. Last spring I planted a piece of corn with manure from the barn-cellar, calculating, should it be a good corn year, to raise from eighty to ninety bushels per acre; but, to my

disappointment, I found a great failure, owing, partly, to using shavings the last winter for bedding in my stable.

28. In the fall of the year, I drew muck into my cow-yard to the depth of eighteen inches, covering this eighteen inches deep with soil from the higher land; I then cut off from the asparagus bed its present growth, covering it over the yard; then, with the addition of leaves from the forest, I have a dry and clean yard for the winter and spring. The first part of June, I draw from the barn-cellar into the yard from seventy-five to one hundred loads of manure, and overhaul the whole compound together, using a good deal of care in having it well broken and mixed together. I now have some fifty cords of good compost, which I spread on the grass lands in October and November.

Concord, September 1, 1862.

WORCESTER NORTH..

From the Report of the Committee.

The committee on farms regret that the premiums offered by the society do not induce more of the good farmers of Worcester North to compete by entering their farms. Some years there has been none, and this year but one, and that owned and improved by Mr. Martin Johnson of Lunenburg. Mr. Johnson's farm is situated about one-half a mile south-easterly from the centre of the town, on an eminence, and on both sides of the road leading to Lancaster. His mowing, tillage, garden and orcharding, with the buildings on the easterly side; the pasture on the westerly side; the whole in but two lots, thereby getting rid of all subdivision fence. All the land on the easterly side of the road is of the first quality. Your committee visited his farm on the seventh of July. His crops of hay, corn, and potatoes looked very well; also his garden-seeds and vegetables, &c. His buildings are good, convenient, and well arranged for the making and saving of manure. He has commenced reclaiming some of his pasture-land by underdraining and ploughing to subdue the bushes, which we think promises well; and, considering the great improvement he has made on his farm since owned by him, your committee award to Mr. Johnson the society's first premium of fifteen dollars.

For ten years, at least, previous to Mr. Johnson's owning the farm, as is well known to the chairman of your committee, the land on the easterly side of the road, being all then in grass, had the following treatment: During that time the owners gave it two or three bountiful top-dressings of guano and plaster, (without the application of any other manure,) which produced very large crops of grass. The grass was sold every year, and carried off the premises. Many who thought the guano and plaster only a stimulant, prophesied that such treatment would eventually exhaust the land, and it would become worthless; but the fact, under Mr. Johnson's treatment, by ploughing and cultivating, has proved the reverse, and that the land was not impoverished. You have the statement of Mr. Johnson; one fact, however, we think should be stated somewhere—that he has no help except what he hires, so that the present season he could not have had many leisure hours.

THOMAS BILLINGS, *Chairman.*

Statement of Martin Johnson.

The farm of thirty-eight acres that I entered for premium, I bought in the fall of 1856, without buildings or fence on it, as part of your committee know. Since then I have put up the buildings. The next season I think I cut about six tons of hay, built two hundred fifty rods of wall, and dug one hundred thirty rods of under-drain, ploughed and re-seeded all of the land that had previously been cultivated, and set about three hundred fruit trees, consisting of pear, apple and peach, in about equal proportion, and set about thirty-five grape-vines. The present season I have kept on the farm one horse, one pair of oxen, four cows, also one one-year-old colt and three young cattle which were summered off the farm.

I make the expenses of the farm as follows:—

Paid for labor,	$78 00
for ashes,	10 00
for super-phosphate,	32 00
for taxes,	30 52
for interest of farm,	192 00
	$342 52

I credit the farm by :—

20 tons of hay by estimate,	$200 00
100 bushels of corn,	80 00
170 bushels potatoes,	85 00
Growth on 300 fruit trees and 40 grape vines,	300 00
Garden seeds,	35 00
Garden vegetables,	65 00
344 lbs. of butter,	68 80
100 lbs. of cheese,	6 00
1,100 lbs. of pork,	66 00
Pigs,	50 00
Poultry and eggs,	15 00
White beans,	7 00
Digging and laying fifty rods of under-drain,	50 00
Three calves sold for,	12 00
110 bushels of wurzel beets,	20 00
About 300 bushels of turnips,	50 00
One ton of squashes and citrons,	20 00
Two loads of pumpkins,	5 00
	$1,134 80
	342 52
Net balance,	$792 28

NORFOLK.

Report of the Supervisory Committee.

The Supervisory Committee of the Norfolk Agricultural Society submit the following report in regard to their observations for the year 1862 :—

The winter of 1861–2 was rather mild. Snow fell in the latter part of December, and remained on the ground till late in March. The first snow storm ended in rain, which, being absorbed by the snow, was converted into ice by the cold weather which followed. Several subsequent storms were of similar character, and were followed by similar weather. The result was that the ground became covered with a coating of ice, of eight inches or more in thickness, which remained solid and unbroken for more than two months. The effect of the ice was to kill much grass. The manner in which this result is produced we will not undertake to explain; but the fact that ice, adhering firmly to the ground, destroys grass, more or less, is well known. Another fact deserves mention in this connection. The covering of ice prevented the field-mice from burrowing amongst the grass, and these animals, straightened by hunger, were forced to resort to trees, which they attacked above the ice, gnawing off the bark, and thus destroying them. Much damage was done in this way.

The snow and ice finally disappeared, chiefly from the influence of the sun, under an unusually high temperature for the season, causing high freshets in many streams, the Connecticut and some other northern rivers having reached a higher point than before for many years. April and May were much dryer than usual, only 4.05 inches of rain having fallen during those months against 7.30 inches as the average. But with the beginning of June the weather became wet, and from that time onward there was not a day during the season when grass, or any other vegetation, in this section, indicated any want of moisture.*

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* The unusual wetness of the last summer and autumn, in this vicinity, having been the subject of general remark, the chairman of your committee thought it might be important to obtain accurate statistics, showing how the season would compare with others, in regard to the quantity of rain for each month. A note, therefore, was addressed to Professor G. P. Bond, of Cambridge, who kindly furnished a table, giving the quantity of rain and melted snow registered at the Observatory of Harvard College, from the beginning of the year 1862 to November 28th of the same year, with the average amount for thirty-four years at Boston. From this it appears that, notwithstanding the remarkable dryness of April and May, the aggregate quantity of water which fell from the 1st of January to the 28th of November, exceeded by nearly a foot the average quantity for the year, as follows:—

	At Cambridge—1862. in.	Average at Boston for 34 years. in.
January,	7.69	3.45
February,	2.79	3.31
March,	6.21	3.58
April,	1.73	3.79
May,	2.32	3.51
June,	6.29	2.64
July,	5.05	3.30
August,	6.29	4.28
September,	4.66	3.28
October,	5.24	3.47
November to 28th,	6.73	4.31
December,	–	4.14
	55.00	43.06

In regard to agricultural products, the season was on the whole propitious, so far as relates to this section. The first crop of hay was in some instances lessened by the spring drought, and in others was deficient from injury done by ice, as before mentioned; but the crop was nearly an average one, and under the favorable weather which followed, the aftermath was abundant. Pastures were green and luxuriant from June to November. The crops of small grain (so called) gave, generally, an average yield, with the exception of wheat, which from the attack of blight, was not so uniformly good as it had been for several previous years. Indian corn gave a fine yield, notwithstanding fears were for awhile entertained that much of it would not ripen. Potatoes grew finely through the season, and the yield was generally more abundant than that of any previous crop for several years. Still the tubers have not been altogether free from the *rot*, that mysterious malady, which for nearly twenty years has been more or less destructive to the crop, both in this country and in Europe.

But the special characteristic of the season in regard to productions was the abundance of apples and pears. The yield of these fruits was even greater than that of 1860, which was regarded as unprecedented. Cherry trees have not recovered from the great injury sustained in the autumn of 1860 and the following winter. The crop was very small, and the quality of the fruit generally inferior. Peach trees of proper age for bearing, which were not killed by the winter of 1860–61, bore fair crops of good fruit in 1862.

It will be recollected that some species of insects, not heretofore common in this section, appeared here in great numbers in 1861. Allusion is particularly made to the army-worm and grain aphis or louse. The ravages of these were spoken of in the report of this committee for last year. Fears were entertained that the voracious army-worm would reappear in 1862, in increased numbers, although, as stated in our report for last year, we have no instance in the history of the insect that it has appeared in great numbers, in the same locality, two years in succession.

But we have now to record the singular fact that there is no account of the appearance of the army-worm, in any part of the country, during this year. When we consider that it appeared in myriads last year, in certain districts throughout a vast extent of country, its non-appearance in 1862 is a mystery not easily explained. It is not to be supposed that the insect has become extinct. It undoubtedly still lives in sufficient numbers to continue the species, though hidden in its secret haunts from ordinary observation. We will not speculate on the causes of the sudden disappearance of this insect, but will merely say, that, as we have intimated previously, the attack on the army-worm by various parasites, has, doubtless, had much to do in lessening its numbers.

The grain aphis reappeared the past season, though the damage it did was less than the previous season. On some farms, where it greatly lessened the yield of wheat and oats in 1861, little or no injury was experienced from it in 1862. This insect is also attacked by various parasites. The lady-bug (*Coccinella*) of several species preys on it; and on some fields of grain which were attacked by the aphis, these parasites were seen in such numbers that they cleared the grain of its countless enemies in a few days.

In August the committee visited the grounds of the president of this society, Hon. Marshall P. Wilder. It was not the first visit we have made to this place; but during the present season fruits formed so prominent a feature in the productions of the county, that we gladly availed ourselves of the opportunity of repeating our examination of the president's orchards, &c. Our attention was first called to the pear orchard, which covers about ten acres, and comprises twenty-five hundred trees, which have been planted from five to thirty years. A large proportion of these are on quince stocks, Colonel Wilder having always thought favorably of this mode of propagating the pear for such varieties as succeed on the quince. He has beautiful trees of the so-called dwarfs—some of them are thirty feet high—probably as old, or older, than any in the country, and producing a barrel of excellent fruit in a season. He was one of the first, if not the first, to recommend the planting of dwarfs, so as to entirely cover the quince stock—a method which protects it from the ravages of the borer, causes the quince to swell up evenly with the pear wood, and enables the pear to send out roots, which give permanence and size to the tree. Thus the only bearing of the tree from the influence of the quince stock is secured, and when it is furnished with fruit-spurs retains them even after it has thrown out pear roots. Some of the most flourishing dwarfs are from thirty to forty years old.

The season of 1862 was the most productive that has occurred since the orchard was planted. Col. Wilder remarked, on bringing to our view the loaded trees, that he had had fruits in former years, but this year brought *fruition.* His crop of pears of this year exceeded a thousand bushels, ripening from July to March. The collection embraces more than eight hundred kinds—the orchard above alluded to consisting principally of the following: Bartlett, Louise bonne de Jersey, Urbaniste, Beurré d'Anjòu, Vicar of Winkfield, Buffum, Doyenné Boussoc, Lawrence, Merriam, and a few other sorts. The Beurré d'Anjòu has been for years a favorite with Col. Wilder, and we believe he has stated that, if, after all his expenditures and exertions, he had only acquired this variety, he should feel that he had been repaid, and had conferred a lasting benefit on the country by its introduction.

Colonel Wilder had eighty bushels of Beurré d'Anjòu pears this year, which brought three dollars per bushel. In former years they had brought much higher prices. Among the trees which particularly attracted our attention were several large Buffums, some of which, we learn, produced over four barrels of fruit each.

The committee visited Colonel Wilder's nurseries, and were particularly pleased with the handsome and thrifty appearance of the trees, both of the apple and pear. The neatness of cultivation noticed throughout his grounds was another very agreeable feature, and, we doubt not, one highly important in regard to profit.

Some of the committee visited the pear orchard of Mr. Edward Ives, a neighbor of Colonel Wilder. This consists of two acres, the trees having been planted in April, 1861. A portion of the ground was quite wet, and required draining, which was done with tiles, at the depth of two feet, and distances of about two rods. The ground was trenched and manured; and notwithstanding the unfavorable predictions which were made in regard to the success of pear trees in such a locality, upwards of two hundred dollars worth of fruit was sold from the orchard the present year—a result which indicates what may be done by thorough culture.

The committee also visited the farm of Messrs. Frederick Clapp & Brother, of Dorchester, where they saw the seedling tree, which produces the pear called Clapp's Favorite, originated by the late Thaddeus Clapp, Esq. Of this splendid fruit we need not speak particularly in this connection, as it has been several times noticed at the exhibitions of this society, and described through other channels. The tree is a very fine one, large for its age, and of healthy and thrifty habit. Mr. Clapp also originated several other seedling pears, some of which are deemed valuable.

The committee noticed the manner in which the Messrs. Clapp occupy their grounds with different crops. Among the apple trees, which are very large and noted for their productiveness, currant bushes are set, and in the least shaded places, sugar beets, parsnips and carrots are planted. They obtained no less than twelve hundred bushels of currants this year, from bushes thus planted. The root crops are grown chiefly for feeding the stock kept on the farm. It should be remarked that though this system of culture is, in this case, highly successful, it cannot be carried out except with very liberal annual supplies of manure.

The committee called next at the farm of Cheever Newhall, Esq., in Dorchester. Mr. Newhall has long been known as a successful cultivator of fruits. On the grounds attached to his residence he has fifteen acres, devoted mostly to apples, pears, and red and black currants. His apple and pear trees, which are generally of the most esteemed varieties, were loaded to their utmost capacity with fruit. The red currant was so generally abundant this year, and its price in market so low, that Mr. Newhall gathered no more of his crop than was wanted for home consumption. Of the black currant, however, he made wine. He has for several years made wine from this fruit, and that which has acquired sufficient age has been brought into market, where it has already become known as a valuable article medicinally, and as a pleasant and wholesome beverage in warm weather. It may be stated in this connection that in France the black currant has, within a few years, been used for making wine to a very great extent, and its production for this purpose is rapidly increasing in that country.

In connection with fruits, Mr. Newhall produces some vegetables for market. Early potatoes are an important article. Mr. Newhall's mode of starting the sprouts on the potatoes to be planted is worthy of notice. He puts them in narrow boxes, on three sides of which strips of boards about two inches wide are nailed, with spaces between them of an inch wide. These boxes, holding perhaps a bushel each, are filled with potatoes, and then brought within the influence of the heat of the furnace, which warms the dwelling, the furnace being in the cellar. Care is taken to bring them into just that temperature which will gradually start the sprouts without withering the tubers, which can be ascertained by carefully watching them from day to day. The object is to have a good, strong, but not very long sprout by the time the ground is ready to plant. From potatoes thus sprouted, Mr. Newhall obtained a yield of 150 bushels per acre, this year—the whole crop having been sold in July at ninety cents per bushel. The ground was then sown to turnips, which yielded 266 bushels per acre, and sold on the field at fifteen cents per bushel.

Mr. Newhall called attention to a very handsome lot of cabbages, on ground from which a crop of strawberries had been taken the present year. The vines were turned in with the plough, after they had done bearing, a dressing of manure applied, and the cabbages planted. The ground was entirely free from weeds, and the crop of cabbages promising. We learn that they made a good return.

Mr. Newhall leases fifty acres of his farm. The committee went over a portion of this, which they found had yielded large crops of hay, Indian corn, vegetables of various kinds, and apples and pears. An apple orchard, which has been planted eight years, attracted attention, from the good condition of the trees and their productiveness.

In regard to the general productiveness and profitableness of the farm, we need only to cite the fact that the tenant, Mr. Harding, pays Mr. Newhall a satisfactory sum as rent, and lays up money for himself. A former tenant was enabled, in the space of five years, to lay by enough to purchase a fine farm in a neighboring town. These simple facts, and others of like character which might be cited, are sufficient to settle the point, often agitated, respecting the practicability of making farming profitable in this section.

The committee went over a portion of the Welles Farm, Dorchester, belonging to the heirs of the late Hon. John Welles, a prominent agriculturist and promoter of agricultural improvement. The farm is leased by Luther Spear, Jr. Vegetables for market, in connection with milk are the leading objects. Sugar beets, mangel wurzel, and Swedish turnips are cultivated for feeding the cows. The crops were promising.

Mr. Spear's success in growing late-planted Indian corn deserves notice. He called our attention to a lot of two acres, planted on the 13th of June. The ground was sward; was ploughed just before the corn was planted, a good dressing of barnyard manure spread on and harrowed in. The corn was never hand-hoed; the cultivator was run through it twice. At the time of our visit, August 21st, the growth was large, and excepting that it was rather too thick, the prospect was favorable to a large crop. Mr. Spear has planted corn as late as the 22d of June, and got forty bushels per acre. When planted on sward, at that season of the year, the decomposition of the sward takes place quickly, and the growth of the corn is very rapid.

Mr. Spear greatly prefers sweet corn to the common kinds for fodder. He stated that in feeding his cows last winter on the fodder of sweet corn, the supply became temporarily exhausted, and instead of the fodder a full supply of the best hay was given, the keeping in other respects being the same that it was before; but the quantity of milk decreased considerably, till by removing some hay another supply of corn fodder was reached, and on returning to it the cows soon gave the former quantity of milk. This was the dried stalks from which the ears had been sent to market as "green corn." The stalks were cut close to the ground soon after the ears were gathered.*

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*Since this report was written, Cheever Newhall, Esq., has informed the chairman that he planted three-fourths of an acre of sweet corn, in the latter part of May, dropping the seed with a corn-planter, in rows three feet apart, and in hills about two feet apart. The cultivation was nearly all done with the cultivator. Sixty barrels of ears were sent to Boston from the lot, and on the 15th of September the crop was cut close to the ground and shocked—the stalks

A portion of the committee visited the farm of Ellis Tucker, of Canton, on the 2d of July. They were unfortunately prevented by rain from making as extensive examinations in the neighborhood as they had intended. Mr. Tucker's farm was occupied by his ancestors for several generations. Since it came into his possession he has repaired some of the buildings, made important additions, and erected a convenient stable and carriage-house. The farm is situated on the eastern shore of Massapoag Pond, a portion of it sloping very handsomely to that fine body of water. Most of it is naturally very good for grass, though a considerable part would be benefited by drainage. Some small streams, rising from springs on the land, might, if drains were first properly laid, be readily made to irrigate several acres. Some of Mr. Tucker's land has been in pasture a long time—probably ever since the original forest was cut off, two hundred years ago. The best of it still produces very good feed, but not as much or of as good a quality as formerly. Among the various means which have been resorted to for the improvement of pastures, wood ashes have been found to produce the best results. The effect of fifty bushels to the acre, unleached, is to produce the most luxuriant and nutritious feed for many years. We are not aware that any experiments have been made by Mr. Tucker in reference to the comparative effects of leached and unleached ashes.

Mr. Tucker cuts heavy crops of hay, which are kept up mainly by top-dressing—a system which he prefers to ploughing the land much, especially as it is generally rather stony and hard to cultivate.

We had scarcely time to go over the main portion of Mr. Tucker's farm and a part of his brother's adjoining, when rain put a stop to our pleasant walk. We may say, in passing, that the Messrs. Tucker take especial pains in the selection of their stock, both cattle and horses, and on few farms have we seen

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being quite green, as the variety was late. It remained on the field in shock till about the middle of November, when it was housed. Mr. Newhall states that he has fed the fodder to a cow and to his horses, which eat it with evident relish, and without the least waste, although the stalks were not cut. He is so well convinced of the value of the fodder of sweet corn that he intends to raise enough in future to feed his horses through the winter.

better. Several of the cows were not only handsome, but evidently very profitable.

On the 26th of June the committee, by invitation, visited Dover, meeting at the farm of Calvin Richards. On this occasion, as well as several other appointments, the state of the weather interfered with the arrangements. Rain fell copiously during the preceding night and during the morning of the day of our visit. This rendered walking over farms—particularly through tall grass and grain—much less agreeable, to say the least, than it would have been in dry weather.

Mr. Richards' farm consists of 160 acres. It is mostly rather stony, but much of the soil is strong and good for grass, which is the leading crop. He uses the Buckeye mowing-machine, by which he is satisfied he can cut grass cheaper than by the scythe; and thinks farmers, on rough and stony land, should endeavor to bring their fields into such a condition that the grass crop can be readily cut with machines. He prefers barley as a crop to "seed down" with, as being better for the grass than any other grain. It is also a good crop in reference to the grain and straw which it furnishes. Mr. Richards' barley fields appeared promising.

Mr. Richards has commenced the improvement of old pasture land. On a tract near his house he has cut bushes, dug stones, drained a wet basin, and ploughed—the land having never been ploughed before. The crops growing on the land, at the time of our visit, were chiefly corn and potatoes, which looked well. On another tract Mr. Richards has cut the bushes, with a view of eradicating them and encouraging the growth of grass. But these experiments have not been carried on for a sufficient length of time to justify a positive conclusion in regard to their advantage.

The committee made a very brief call at the farm of Ephraim Wilson. He has commenced the reclamation of a piece of swamp land, by draining and applying to a portion a coating of gravel. The grass appeared well, but we had not the opportunity to examine the lot thoroughly.

Our next call was at the residence of Benjamin Newell, Charles River Village. Mr. Newell is a manufacturer of paper, and only occupies about twenty acres of land. He, however, shows his appreciation of the importance of agriculture, and the interest he feels in regard to its improvement, by the support he gives to the Norfolk Agricultural Society, of which both himself and his wife are members. Of course, with the small quantity of land which Mr. Newell occupies no very extensive farming operations can be carried on. He keeps no more stock than is necessary for his own use or convenience. Two cows which he keeps are worthy of notice on account of their age, one being twenty and the other seventeen years old. They have been kept to this age on account of their excellence for milk and butter. We had occasion to see and taste butter which had lately been made from them, and its quality was such as to elicit various remarks in its praise.

The committee made a brief call at the farm of Mr. Kirby. He is an architect by profession, and his business has heretofore been chiefly in Boston. He has lately purchased the farm on which he resides, and is engaged in extensive improvements. A neat and tasteful house is already completed; new fences, consisting to a considerable extent of handsome stone walls, have been erected; many shade and ornamental trees planted, and at the time of our visit the barn was undergoing a reconstruction, which will render it more spacious and convenient.

The committee found the premises of Hiram W. Jones in a condition which plainly indicated that order and neatness are here regarded as fundamental principles. Evidences of a plan, combining convenience and economy, are obvious, from the dwelling to the barn, piggery, and poultry house. Space will hardly admit of our going into a particular description of the various buildings. We have seldom seen so many objects so well combined in the same space as are embraced in Mr. Jones's barn. Being situated on a hillside, it has a basement story and a cellar, both of which are sufficiently dry, light and airy. Water from an aqueduct which supplies the house, is carried through them. The stock is kept on the basement story, which is so protected that frost cannot much affect it.

Mr. Jones makes the fattening of calves a business of some importance. They are bought at Brighton, when from a few days to two weeks old, and are fattened on milk, which they suck from the cows. The rearing of early chickens is another branch here carried on with success. They are hatched in March and sold in June, generally at fifty cents a-piece.

Mr. Jones's farm is mostly of quite light soil, part of it too sandy and loose to bear good crops of grass. Yet he turns even this part to good account, chiefly by the cultivation of beans, for a crop of which, quite young at the time of our visit, he received a premium of the society. He showed us promising crops of rye and Indian corn, grains with which he generally succeeds well.

The committee called at the farm of Mr. Kenrick. This consists of 150 acres, situated mostly on the southerly slope, and near the summit of a large hill. The soil is loamy, strong, and good for grass and fruits. The dwelling is nearly new, spacious and well finished. A large barn was burnt here a few years since, and a temporary one only has since been built. Mr. Kenrick has one of the finest orchards in the county, ten years from the nursery. The trees are large, well shaped, and kept free from moss and insects. Mr. Kenrick's mode of defeating the borer is worthy of notice, as it appears to have been entirely successful. The ground comprising the orchard has been kept in cultivation, potatoes being generally the crop planted. At the last hoeing—the last of June or first of July—a mound of earth is raised round each tree to the height of seven or eight inches. When the beetle comes to the tree to deposit its eggs, it places them on the bark, just at the surface of the earth, not being able to get at the tree near the roots. In the fall, at the time the potatoes are dug, the earth which had been drawn round the tree is hauled away, leaving the part attacked by the borer in plain sight, and as the larvæ have made but a slight entrance, they are easily destroyed. We should remark that when the apple orchard was planted, peach trees were put between the apple trees, the latter being two rods apart. The peach trees were set in the centres of the squares formed by the apple trees. The peach trees being comparatively short lived, came into bearing and produced several good crops before the apple trees attained such a size as to be at all interfered with. Some of the peach trees are still standing, and produced a fair crop this year. But they will all probably be dead by the time the apple trees need all the ground.

A call at the farm of Henry Golding ended our observations in Dover for this time. This farm has been previously visited by the committee. The farm is noted for its large orchards and the large quantity and fine quality of cider produced. Many of the apple trees are quite old, though still productive, the soil being well adapted to them. A flourishing young orchard is coming into bearing. Mr. Golding sells large quantities of cider at a good price. It is filtered through sand, as it runs from the press, and sold immediately from the filter at from four to five dollars per barrel—the barrel being returned or paid for. Mr. Golding is extending his reclamation of wet lands—his former operations of this kind having been quite satisfactory. He uses the Buckeye mowing machine.

An appointment was made to visit Franklin on the 28th of July. Here, again, rain interfered with our designs, and the chairman found himself the only member of the committee present out of the town of Franklin. Nevertheless, examinations, though necessarily somewhat hurried and imperfect, were made of a few farms. First, we reviewed the farm of S. W. Richardson, which was visited and reported on in 1860. Our object, in part, on the present occasion, was to learn the result of certain improvements which had been commenced at the time of our former visit, particularly the result of draining some kinds of soil. In 1860, drains were made where a "hard-pan," or deposit of iron, had rendered the subsoil, even to within a few inches of the surface, very hard, it being almost impervious to water, and ungenial to plants. It was deemed important to ascertain whether the sinking of drains in the soil would produce such a change as would render it suitable for the growth of crops. We are happy to say that the desired change has already been effected to some extent. On a portion of the drained land a heavy crop of Indian corn was growing at the time of our last visit, and on another portion a fine crop of potatoes—a considerable part of the land occupied by the latter having never produced a crop of any value before the late improvements were made. Mr. Richardson states that the "hard-pan" is evidently undergoing a decomposition, as the air obtains access to it through the drains, and that he can perceive that it softens by the greater depth to which the plough can be run.

We are happy to speak of the general neatness practiced by Mr. Richardson and his son in the management of their farm. They appear to realize the truth of the adage, " One year's seeding makes seven years' weeding ; " and they probably agree with another good Franklin farmer, that " they can't afford to raise weeds."

The committee called at the farms of J. T. Bacon and Elisha Bullard, but were unable, on account of the increase of the rain, to make many examinations. Mr. Bullard's farm exhibits various indications of good management. The fields are handsomely laid out, and enclosed by substantial stone walls. Drainage of some wet tracts has been commenced with good results. We would venture to suggest, however, that additional depth would insure a better quality of hay—that being the crop which it is intended to produce—and probably increase the weight, if not the bulk. Drains should not be less than two and half feet deep, and on springy land an additional half foot would be very beneficial.

Mr. Bacon's barn is well planned, well finished, and kept with scrupulous neatness. There is a cellar under the whole, in one part of which the manure is kept ; but it is so deep, dry, and well ventilated, that other parts are used for other purposes. A shed is attached to the north-east corner of the barn, by which the cold winds are kept from the yard, while the sun is admitted ; thus making, in connection with part of the cellar, a sheltered and pleasant place for stock in winter. Running water is brought into the shed.

The farm of William Metcalf has been spoken of in previous reports of the committee. A short call was sufficient to show that he still progresses in his improvements. He has within a few years made a handsome and productive field from what was previously a wild, rough pasture. Besides removing boulders of various sizes, a large quantity of cobble stones has been taken off, and as there was no better place to deposit them, they were piled on one side of the field. But it should not be inferred from this that the ground they occupy is wholly wasted.

Grapevines are planted at the base of this huge stone heap, and the vines spread themselves over its surface. Though yet young, they bore considerably the present year, and, doubtless, will in a few years cover the stones and produce abundance of fruit—thus converting what would otherwise be an unsightly object into one of beauty and profit. The grapes are of native kinds, but selected on account of their superiority. We have previously noticed Mr. Metcalf's success in cultivating native grapes, which he finds no difficulty in disposing of, in various ways, at a satisfactory profit.

A call at the farm of Walter Fisher closed our examinations in Franklin. In addition to what has been said of this farm in a previous report, we may say that its appearance the present year was in no respect inferior to what it has heretofore been. The principal point to which our attention was directed was the condition of a tract which has been reclaimed from a rough pasture, for which Mr. Fisher has received a premium of the society. A considerable portion of the tract has been thoroughly subdued and cultivated, and is laid down to grass, with a surface so smooth that a mowing-machine can be made to cut the grass as closely as is expedient. Other portions are still in process of improvement, and present favorable indications. The experiment has now reached a point which, we think, justifies the conclusion that it will *pay*.

It is proper that some mention should be made in this report of the experiments in irrigation, as conducted by Artemas Newell, of Needham, and E. L. Metcalf, of Franklin, and which have been spoken of in previous reports. The chairman visited Mr. Newell's grounds on the twenty-fifth of June. The water was found flowing between the pear trees and the strawberry beds as usual; but in some respects its advantages had not, this season, been equal to what they have formerly been. The season, after May, having been a wet one, there was less necessity for supplying water artificially. A considerable portion of the strawberries were killed by frost; so that in any event this crop could not show to so good advantage as in previous years. In consequence of the copious and frequent rains, some of Mr. Newell's strawberry beds, on rich lands not irrigated, were nearly as productive as the irrigated beds.

Mr. Metcalf having been very closely engaged the present season with matters somewhat distinct from the usual routine of farming—a part of his business having been the building of one of the best barns in the county—did not avail himself to the full extent of his advantages of irrigation. The water was, however, turned over a portion of the land which has been prepared for that process. A newly-seeded tract of several acres, irrigated for the first time, produced three crops of hay this year. It was not weighed, but Mr. Metcalf states that the first two crops were as large as he could make on the ground, that the third crop was what would ordinarily be called a good one for a second crop, and that even after this had been taken off, a growth of considerable bulk sprang up.

We may add, that extended observation from year to year, only accumulates evidence in regard to the great advantages which may be derived from irrigation, and it is to be hoped that so important an object will receive increased attention from our farmers.

Sanford Howard, *Chairman.*

PLYMOUTH.

Report of the Committee.

It is with much pleasure to the committee on farms that they are able to report three entries for the society's premium of one hundred dollars for the best cultivated farm, during a four years' course, commencing in 1862. The competitors are Charles G. Davis, of Plymouth, President of the society; Austin J. Roberts, of Lakeville, and Albert G. Pratt, of Middleborough. It is very fortunate that all of these gentlemen are deeply interested in agriculture; own farms of nearly equal dimensions; are possessed of liberal means for conducting the work of their farms to the best advantage; and, in all respects are well suited to be competitors with each other. The dwelling-houses are surrounded by tastefully ornamented grounds, the barns and appurtenances are ample, and the stock of horses, cattle and sheep are excellent.

The annual statement of such competitors must give information that will prove valuable to the agricultural community.

Mr. Ephraim B. Thompson continues his annual report in competition for the society's premium of seventy-five dollars, payable in 1863. The present year, Mr. Thompson's farm shows many signs of improvement, particularly in the product of hay, which is double what it was in former years.

The committee visited, as usual, the farm of Mr. Orlando S. Shaw, but did not find him at home. For some unexplained reason, his annual statement has not been handed in.

CHARLES BURTON, *Chairman.*

Statement of Ephraim B. Thompson.

For several years previous to the time of our entry in 1859, the society had offered premiums on farms, but there seemed to be a reluctance to engage, and there were no entries made. The society ought not, year after year, to lose the benefit of a report, for after all we receive our best ideas and hints from the experience of practical farmers. Though I am far from thinking my management the most judicious or the best, for now in looking back I can see many omissions, I feel we have much, very much, yet to learn in farming.

But I must say, we have had the satisfaction of knowing, instead of conjecturing, at the close of the year, how much a ton of hay, a bushel of corn, or turnips, have cost. Also of seeing two blades of grass growing, where there formerly was but one, and land, as it was, not worth any thing, now yielding a heavy crop of hay of good quality. The old adage certainly is true, "he that carts sand makes land."

For several years past I have striven to increase my hay crop for home consumption exclusively, believing that to be legitimate farming, the sure way to renovate our exhausted and worn out fields. The question is often asked, will it pay to reclaim swamps, to take worthless land and convert it into meadow?

The following is an exact account of debt and credit, of a lot containing one hundred and forty-three rods, which on the valuation list formerly was rated unimprovable. In the autumn of 1859 it was under-drained so as to take off the spring water, and converted into English meadow, at a cost of $80.79; I think the items of expense were given in my statement of the year 1859:

Dr.		
1859.	Expense of reclaiming, ...	$80 79
1860.	One year's interest on above sum, . . .	4 84
"	Expense of haying, ...	3 00
		$88 63
Cr.		
1860.	To 3,130 lbs. of hay, at 80 cts. per cwt., .	25 04
		$63 59
Dr.		
1861.	One year's interest on $63.59, . . .	$3 81
"	20 loads compost, including carting out, .	24 00
"	Expense of haying, ...	4 00
		$95 40
Cr.		
1861.	To 5,000 lbs. hay, ...	40 00
		$55 40
Dr.		
1862.	One year's interest on $55.40, . . .	$3 30
"	Ten loads compost, ...	12 00
"	Expense of haying, ...	3 50
		$74 20
Cr.		
1862.	To 4,750 lbs. of hay, ...	38 00
	Balance, ...	$36 20

From the acre on which I spread two hundred and ten loads of sand last autumn, and seeded to Timothy and redtop, I this season had one ton of hay of good quality; in August last I spread twenty loads of compost, the first manure that has been applied to the lot.

The lot situated east from the barn, which was under-drained in 1859, has been mowed two years, producing three tons to the acre; I have this autumn dressed it with twenty loads of compost.

From nine acres mowed the present season, I had twenty tons English hay.

Corn, two acres sward, a deep loam; on one acre ploughed in twenty loads coarse manure six and a half inches deep; the other acre ploughed same depth, and at the suggestion of a friend, did not plough in any manure; on the whole piece put two-thirds of a gill of poudrette in the hill. Nearly one-half of the field, which was moist ground, was injured by the wire-worm, and later in the season, by a worm which eat off the roots; for a time it seemed doubtful whether there would be any thing on one-half of the piece.

Now I think it is claimed by the manufacturers or venders of poudrette, that no worms will stay in a hill of corn where it is placed. That did not prove true in this instance, for the corn-hills were infested with worms both early and late.

From the whole piece we harvested forty-five bushels, twenty-eight bushels from the part where the manure was ploughed in, and seventeen bushels from the other half.

The other acre was planted to corn last year, ploughed in twenty loads manure, planted three and a half feet apart each way, with a half pint of compost of hen manure and muck in the hill. The corn had a very thrifty appearance until the first of August, when it began to fail on account of the drought, it being a dry, gravelly piece of ground, and was injured more, without doubt, than it would have been, had it been sward land last spring. Harvested forty bushels.

Potatoes, one acre; planted in rows, three and one-half feet apart; hills eighteen inches. Potatoes were cut so that there were three eyes on a piece, and one piece to a hill, with a tablespoonful of plaster in each hill; no other manure except what remained of last year's dressing of twenty loads to the acre. The lot was planted to corn last year. Had one hundred thirty bushels of four varieties; Davis's Seedlings were the best.

Carrots, twenty rods; had forty bushels, at a cost of twenty-one cents per bushel.

Turnips, two hundred and seventy-three bushels, at a cost of six and one-half cents per bushel; they were Skirving's improved Swedish turnip; planted one-half an acre. The lot was planted to corn last year. First of June ploughed in ten loads of manure; planted with a seed-sower, June twentieth, in rows two feet apart. Very soon after they were up, some insect—

probably a fly—destroyed one-fourth of the young plants, eating them off near the ground. We have planted this kind of turnip for several years; there is no root that can be raised so easily, with so little expense for store-cattle in the winter.

In the month of August, ploughed one acre of sward, spread on twenty loads of manure from barn-cellar; September fifth, sowed one and one-half bushels of winter wheat, the bald variety; harrowed well, and rolled the ground. The wheat is now well set; looks very promising.

My stock at the present time is as follows: two horses, two oxen, three cows—three two-year-old, one yearling—and twenty-four sheep.

I house my cattle at night throughout the year, bedding them on sawdust in the summer, and with straw and leaves in the winter, always keeping a good supply of soil or loam in the cellar under them, where every thing is overturned and well mixed by the swine. Manure from the barn-cellar always tells, if properly applied to a growing crop.

PRODUCTS OF THE FARM.

85	bushels	corn,	$75 00
40	"	oats,	24 00
130	"	potatoes,	50 00
4	"	beans,	10 00
273	"	turnips,	80 00
40	"	carrots,	14 00
175	"	apples,	40 00
20	tons	E. hay,	320 00
14	"	F. hay,	125 00
Beef and pork,			55 00
180	pounds	butter,	39 60
183	"	cheese,	20 00
Calves sold,			12 00
11 pigs,			33 00
Sheep and lambs,			44 00
Wool sold,			24 50
			$966 10

EXPENSES.

Interest on improved land, buildings, and stock,	$182 00	
Taxes on the above,	25 00	
Labor,	190 00	
3 tons salt hay,	30 00	
Manure applied,	125 00	
Grass seed,	5 00	
Keeping cows and sheep one year,	150 00	
		$707 00
		$259 10

Halifax, November 15, 1862.

Statement of Austin J. Roberts.

The farm offered for the society's premium contains one hundred sixty-seven acres, divided as follows:—

Acres mowing and tillage land,	30
pasture,	60
woodland,	50
bog meadow,	27
	167

The soil is gravelly, subsoil sand, and in parts yellow loam, intermixed here and there with clay. The mowing and tillage land, for the most part, is of an uneven character; in portions hilly. This farm has been for many years unproductive, producing little hay, no fruit, and but a small amount of the cereals; the greater part of the tillage land might have been well compared to "poverty-stricken rye-fields," upon which nothing else than an occasional crop could be profitably grown. This was the state of things when a renovation commenced, and a systematic course of farming was introduced.

The situation of the farm was always pleasant, being nearly surrounded by a chain of lakes and commanding them from almost every point; but of late years, much has been done by art, and the place made doubly attractive by the setting out, from time to time, of hundreds, if not thousands of evergreens and deciduous trees, many of them having been raised and grown on this farm.

In cultivating this farm, my leading idea has been to improve the character and texture of the soil, and make the main staple of the place—fruit.

Already three hundred and seventy-five young apple trees have been planted, two-thirds being Baldwins, which commenced bearing a little this year. Two hundred and ten are set out in one orchard and one hundred and sixty-six in another; the rows in the former one alternating with peach trees, for which the soil and the location of the farm, between such large bodies of water, seem admirably adapted.

The pear orchard consists of one hundred standards of various profitable kinds—discarding all but a very few sorts. I have many dwarfs which are not considered.

The peach orchards contain about three hundred trees, mostly small—one hundred being set out only last spring, and comparatively few of the remainder are in full bearing. It is my intention to add six hundred trees in the spring.

Setting out my orchards and ornamental trees has occupied my close attention for some time; yet the essential improvements in the farm buildings, fences, and in the general management of the place, have not been overlooked.

Great attention is paid to making manure and to have not only bulk but quality. None is made in the yards. The barn, sixty by forty, has a high, spacious cellar under the whole, closed in on all sides with doors opening into the yards where sheep are chiefly kept in winter. The cattle are tied up every night in the year, and the manure, with that of the horses, falling into the cellar below, is composted, mixed and worked over by swine. Fine pond sand is kept under the horses, loam under the cattle, and a quantity of soil is weekly thrown into the hog-stye.

My stock usually consists of three horses, four cows, one yoke of oxen, and several young cattle, besides calves, with a flock of about twenty sheep. The neat stock is what is commonly called "Native," but properly a mixture of Ayrshire, Alderney, and Devon. The laborers employed are chiefly Portugese, procured in New Bedford as they arrive from the Western Islands. I take them often without their knowing any thing of our language, and break them in to *my* ways and method of farming. I find them more docile, industrious and trust-worthy than the Irish, besides being contented with far less wages.

In mowing, the Buckeye machine is used, and recommended. And with a horse-pitchfork, our haying (the severest of the farmer's labors) is comparatively light.

In regard to the crops, their expenses, &c., I refer to the subjoined account. It will be seen that the whole labor of the farm proper is charged under the several heads, at cost. In none of these items is there any interest charged on the value of the farm, nor my own services in overlooking the men, &c. Seed, and all incidental expenses, are found under the head of cash. Manure is charged at two-thirds its salable value (one dollar per load) to the crop to which it is applied. It will be noticed that there is much inequality regarding the various charges under board. This is accounted for by the fact that day labor was often employed where the workmen boarded themselves.

No account has been made of some things raised on the farm, as for instance, labor has been expended, and profit derived, in carrying on the nursery business—this of course, being another department of labor, has not been noted, neither the cutting or sale of wood, but merely the annual crops, produced, used or sold.

In conclusion, let me state, that a most important consideration for every farmer, is, to be systematic and accurate in his farm accounts. Every agriculturist should keep an annual record of every field of grain, the expense of every crop, what it has produced per acre, and its value, and the income of his stock; then facts would show whether prosperity or adversity, profit or loss, are the fruits of his toil.

HAY HALL, LAKEVILLE, Dec. 1, 1862.

Account of Crops, Expenses, &c., on Farm of A. J. Roberts.

COST OF CROPS.							PRODUCT OF CROPS.			
Crop.	Labor.	Board.	Team.	Cash.	Manure.	Total.	Yield.	Amount.	Total.	Remarks.
Rye, (expenses of last year added,)	$23 23	$3 33	$5 00	$5 40	–	$36 96	44 bush., at $1 12, present rate,	$49 28		
							3 tons straw, at $8, . . .	24 00	$73 28	Crop fair. Land, "old fields."
Oats, . . .	5 39	1 00	2 50	1 00	$19 00	19 89	3 tons oats, cut green, . .	–	45 00	Very heavy, badly lodged. Cut with mowing-machine.
Hay, . . .	33 15	11 00	7 25	–	25 00	76 40	19 tons English, . . .	$242 00		
							6 tons meadow, . . .	48 00	290 00	A part of hay cut on shares.
Potatoes, . .	15 37	9 00	5 50	11 79	20 00	61 66	115 bushels, at 4 shillings, .	$76 67		Crop, part good, part poor; var., Jackson Whites & Garnet Chilis; the latter readily sells at $1 per bushel, for seed.
							37 bushels, at $1, . . .	37 00	113 67	
Corn, . . .	39 46	15 00	9 75	–	22 00	81 21	130 bushels, at $1, . . .	$130 00		
							3 tons of fodder, . . .	45 00	175 00	Very fine yield.
Turnips, . .	4 95	3 00	2 00	17	4 00	14 12	75 bushels, at 33 cents, . .	–	24 75	Land not suitable. Yield poor.
Beans, . . .	2 50	50	1 00	1 00	1 00	6 00	5 bushels, at $2.50, . . .	–	12 50	
Fruit, . . .	15 00	3 00	6 00	–	11 50	35 50	Peaches, ...	$79 00		
							Pears, ...	32 58		
							Apples, ...	38 60		First crop from orchard.
							Cider apples, 100 bush. at 12 cts.	12 50		
							Strawberries, Gooseberries, Rhubarb, ...	12 38	175 06	

Sheep. Expenses previous winter,	–	–	–	–	–	$24 00	Wool, at 43 cents, . . .	$36 39		
							Lambs sold, ...	28 00		
							Lambs on hand, . . .	8 00		
							Sheep, (bucks sold,) . . .	20 00		
									$92 39	
Poultry. Expenses,	–	–	–	–	–	5 00	Turkeys and fowls, . . .		36 00	Corn and potatoes fed out charged.
Cattle fattened, .	–	–	–	–	–	40 00	1,060 lbs., at 6½ cents, . .		68 90	
Pork fattened, .	–	–	–	–	–	20 00	1,200 lbs., at 6½ cents, . .		78 00	
Dairy expenses, .	–	–	–	–	–	10 00	Butter, 225 lbs., at 25 cents, .	$56 25		
							Milk, ...	18 00		
									74 25	
Calves, . . .	–	–	–	–	–	4 00	.		20 00	
Cauliflowers, Cabbages, Carrots, Beets, Onions,	$5 00	$1 00	$1 00	$0 50	$6 50	14 00	In small quantities, . . .		18 00	Home use.
Farm Expenses, Taxes, Blacksmithing, &c.,	–	–	–	70 00	–	70 00				
Manure for 1863, .	8 00	3 50	3 00	–	–	14 50	Manure, charged, . . .	$160 00		
							Manure, cost estimated, . .	90 00	70 00	
							Receipts from mowing-machine over expenses, from others, .		15 00	
	$152 05	$50 33	$43 00	$89 86	$160 00	$603 24			$1,381 80	

WASTE LANDS.

NORFOLK.

Statement of Joel H. Robinson.

The piece of pasture-land that I offer for premium contains about three acres. I will give you a description of the pasture as it was when I commenced operations. None of it had ever been disturbed by the plough, and it was supposed never could be. It was in a very rough condition. Part of it was covered with maple, alders and small bushes, and stony as the devil's hop-yard.

The character of the soil is somewhat varied,—part of it high and dry; the rest moist with a rich black loam. In the fall of 1860 I commenced operations by ploughing about two acres, which were so full of brakes and roots that it tore up in large blankets, making it necessary to use the bog hoe. I then harrowed and burnt all I could.

For the first crop I planted potatoes, using a small handful of plaster and ashes to every hill. My second crop I planted with the ashes made by burning the bogs and bushes. No manure has ever been applied. The remainder was ploughed in the fall of 1861, and in the spring of 1862 was planted with potatoes, using plaster and ashes, a small handful to each hill. My object was a thorough renovation, whether my crop paid or not.

My account stands as follows:—

EXPENSES.

By ploughing both lots first time,	$24 00
ploughing part twice,	4 00
harrowing and burning,	8 00
bogging and furrowing,	8 00
planting,	15 00
plaster and ashes,	8 00
seed potatoes,	5 60
seed corn,	50
cultivation and hoeing,	20 00
harvesting corn and potatoes,	18 00
Total amount of expenses,	$112 10

PROFITS.

By 6½	baskets round corn,	$30 50	
13	baskets soft corn,	3 90	
	corn fodder,	10 50	
174	bushels large potatoes,	77 30	
46	bushels small corn,	11 50	
	Total amount of profits,		$133 70
	Leaves a profit of		$21 60

In conclusion, I would say that my object has been to prove to the farmers of this county that worthless land can be reclaimed without loss.

North Wrentham, November 1, 1862.

Statement of General Lucas Pond.

My business for the last five years has led me to visit every part of the county of Norfolk, and being a farmer, I of course observed the condition of pasture-lands in particular; and I have come to the conclusion that they are more neglected than any other part of the agricultural interest of the county. I find a large proportion of them in an uncultivated state, producing very little that is fit for cattle to eat, and it appears to me that there must be something done to bring them into a better state of cultivation before we can get much profit from our stock in the summer season. I believe that the plan that I have pursued for the last eleven years is the best that has been presented to the society, as it pays the cost of labor and manure, and leaves the land in better condition than any other way, besides leaving a handsome balance in my hands.

EXPENSES OF LABOR, MANURE, &C., FOR ONE HUNDRED RODS OF LAND THE PRESENT YEAR.

By ploughing and harrowing,	$5 25
planting and harrowing,	8 00
manure, 4 cords,	20 00
6 bushels potatoes for seed,	3 00
digging potatoes,	10 00
	$46 25

PROFITS.

122 bushels of potatoes at 50 cents per bushel,	$61 00
Balance in favor of crop,	$14 75

EXPENSE OF LAYING DOWN AN ACRE THAT WAS PLANTED LAST YEAR.

Ploughing, sowing and harrowing,		$5 00
3 bushels of oats,		1 50
Grass seed,		1 75
Harvesting and threshing,		10 00
		$18 25
54 bushels of oats, at 65 cents per bushel,	$35 10	
30 hundred of straw,	15 00	
		$50 10
Balance in favor of crop,		$31 85
Balance first crop,		14 75
Balance in favor of both crops,		$46 60

The above is as near correct as I can make it.

WRENTHAM, November 30, 1862.

MANURES.

ESSEX.

Report of the Committee.

The committee, in making their report, would again express their great obligations to Richard S. Rogers, for giving the results of another year's experience with the different fertilizers used by him for top-dressing grass land. His statement will be found to confirm fully the testimony of his experiments of the two preceding years in favor of green cow manure. Our farmers may be slow to use such manure for this purpose, chiefly because the practice is so different from that which they have heretofore followed. It may seem to them almost like a waste of manure to apply it green as a top-dressing; but these are the facts, proved by an experiment most carefully conducted, and extending through three different seasons. We commend these facts to all farmers who are not wedded to old customs merely because they are old—to all who are not afraid of what their neighbors may say or think, when they diverge a little from the beaten path. The committee would have recommended a premium to Mr. Rogers for these experiments, but he wished not to be considered a competitor for it.

For the premiums for the best conducted experiments in the application of manures, proposed by the society in 1860, in accordance with instructions from the State Board of Agriculture, and to be made three successive years, there have been two entries, one by Nathan W. Brown, on the society's farm in Topsfield, and the other by Benjamin P. Ware, of Marblehead. The account of the experiment by Mr. Brown for the first two years will be found in the reports on the Treadwell Farm for the years 1860 and 1861. The crop of grass this year on the land upon which the experiment was made was found to be so light, owing probably to the inferior quality of the manure applied at first, that there seemed to be no appreciable difference in the produce of each of the five lots. It was therefore concluded to abandon this experiment, and trust for better results to those begun in 1861 and 1862.

Mr. Ware has this year completed the experiment begun by him in 1860, thus complying with the chief condition upon which the premiums were to be awarded. We annex the several statements for the three years, remarking that each was submitted to the committee at the time it bears date; and was accompanied by a certificate of the weight of the crop.

In the third and last statement Mr. Ware has drawn such general conclusions as the experiment would seem to warrant. Other and perhaps more satisfactory inferences may be arrived at by the Massachusetts Society for the Promotion of Agriculture, when they shall have the statements of the large number of experiments made in different parts of the State; but we hazard the opinion that among them all no one will be found to be more carefully and skilfully conducted than that of Mr. Ware.

ALLEN W. DODGE.
LEWIS ALLEN.

First Statement of Benjamin P. Ware.

The land selected for the experiment with manures had lain in grass for ten years previous to August, 1859, when it was ploughed up.

The surface soil is a dark loam ten inches deep, resting upon a compact gravelly subsoil, retentive of manure; not subject to suffer from drought or excessive wet; it is level; free from rocks or other obstructions, and is considered of superior quality for general cultivation.

There had been but little rain last spring, and on the 16th of April the land was in good condition for ploughing, it being sufficiently dry, and the sod (from breaking up the previous August) pretty well rotted.

It measures six rods wide by ten rods long, which I divided into six equal lots, each one rod wide and ten rods long—making ten square rods of land in each lot. Upon lot No. 1 I spread evenly four and one-half feet of manure (at the rate of nine cords per acre,) composted from equal parts of peat mud, sea manure and horse manure, all forked over together three times, and allowed to ferment each time. I then ploughed (April 16th,) the whole land eight inches deep, then harrowed very thoroughly, until the sod was well pulverized.

April 17th, lot number two was spread with the same amount of manure of the same quality, and the whole land cross-ploughed four inches deep. Then lot number three was manured in the same manner as lots number one and two, and the whole land harrowed thoroughly. April 18th, the whole land was furrowed four inches deep, and three and one-half feet apart; and lot number six was manured in the drill, with the same amount and quality as the previous lots. I then planted the whole land with Jackson White potatoes, of small, but not the smallest size, placing them whole, ten inches apart, in the drills.

Then spread upon lot number four, manure as upon the other lots, and allowing it to remain upon the surface; while lot number five had no manure at all.

I am aware that the experiment of lot number six is not required by the society; but it being the common way of applying manure for potatoes in this vicinity, I was induced to extend the experiment for my own gratification; and thinking others might be interested by the comparison, I offer the result of the whole.

The first rain fell, after planting, May 19th, the land being very dry until then. The potatoes were ploughed and hoed three times before the middle of July. Upon the 20th of July, the potato blight struck the tops, but the crop was so far advanced that they did not rot much. The total amount was reduced somewhat, but I think not very much. The whole crop was harvested October 31st; the result of which may be found in the annexed table, together with a brief synopsis of the weather during the season.

No. 1,	large	potatoes,	700 lbs.;	small	potatoes,	292 lbs.;	total,	992 lbs.
2,	"	"	797	"	"	347	"	1,134
3,	"	"	635	"	"	305	"	910
4,	"	"	690	"	"	357	"	1,047
5,	"	"	580	"	"	215	"	795
6,	"	"	630	"	"	265	"	895

WEATHER.

	First Third.	Middle Third.	Last Third.
April, . . .	moist.	dry.	very dry.
May, . . .	very dry.	very dry.	moist.
June, . . .	moist.	moist.	moist.
July, . . .	wet.	wet.	moist.
August, . . .	moist.	moist.	wet.
September, . .	wet.	moist.	wet.

MARBLEHEAD, December 1, 1860.

[For second year's statement, see last Report, 1861, p. 133.]

Third year's statement of Benjamin P. Ware.

In continuing the experiment on the application of man ure commenced 1860, May 1st, 1862, I spread upon lot number six, at the rate of nine cords per acre, manure composted from meadow mud, sea kelp and barn manure, the whole drenched with night soil. I used no manure of any kind upon any of the other lots; then ploughed the whole eight inches deep; then harrowed it.

May 29th, cross-ploughed eight inches deep; harrowed and dragged the whole of the lots.

May 30th, sowed Orange carrot-seed at the rate of one pound to the acre. The carrots were truckle-hoed three times, and hand-weeded twice, during the season, which kept them clean of weeds.

November 14th, harvested the crop, which resulted as follows :—

No. 1,	2,716 lbs.,	at the	rate of	21 tons,	1,440 lbs.	per acre.
2,	2,660	"	"	21	560	" "
3,	2,950	"	"	23	1,200	" "
4,	2,690	"	"	21	1,040	" "
5,	2,755	"	"	22	80	" "
6,	3,220	"	"	25	1,520	" "

The important facts that seem to be established by the result of this experiment are—

First. That for potatoes it is better to spread the manure, and plough it in four inches, than any other depth, or to applying the manure in the furrow and putting the seed on it—the reason of which I think is that all the growth of the potato plant and of the new tubers is above the seed planted; hence manure placed below the seed is quite or nearly out of the natural reach of the plant; but let the manure be placed above the seed, and the growth of rootlets and tubers is among the enriched soil; the plant draws its nourishment directly from it; and at every hoeing the enriched soil is thrown directly about the plant, which causes new rootlets and tubers to put forth.

Secondly. That one-third of the virtue of manure is retained in the ground after a potato crop, for the next year's crop. For a crop of mangels, and probably other gross feeding plants, the advantage of heavy manuring over no manure is over one hundred per cent., or in other words a crop without manure may not pay expenses, when a crop highly manured would be very profitable.

Thirdly. That there is no perceptible virtue of manure left in the land the third year for a crop of carrots, though I think it would prove otherwise with some other crops; and that there is no advantage in high manuring, shown by this experiment, for a crop of carrots, as the increase in the crop is comparatively small, although the growth of tops was very much larger. I conclude that carrots exhaust land much less than most other crops, hence the superior condition of land after carrots for succeeding crops the next year.

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	dry.	dry.	dry.
June, ...	moist.	dry.	moist.
July, ...	moist.	moist.	moist.
August, ...	moist.	moist.	moist.
September, . . .	dry.	moist.	dry.

MARBLEHEAD, November 14, 1862.

Statement of Richard S. Rogers.

Having completed my third and last series of experiments on "top-dressing of grass lands," I now propose to give the results of the present year; premising that all the stakes and bounds remain as originally marked out; that no additional top-dressing of any kind has been added to the lots; each lot being 250 by 45 feet, as mentioned in each former report; and in mowing and weighing the hay the most careful attention was given.

The result of the first and second crops, which were cut in July and September of the present year, was as follows:—

	1st crop.	2d crop.	Aggregate.	
No. 1,	700 lbs.	265 lbs.	965 lbs.	compost.
2,	900	290	1,190	leached ashes.
3,	1,050	300	1,350	green cow manure.
4,	950	280	1,230	dry wood ashes.
5,	450	100	550	peruvian guano.
	4,050 lbs.	1,235 lbs.	5,285 lbs.	

I now take the aggregate of the three consecutive years, and show the production of each fertilized lot as named, adding the whole of the same together, in order to show the crop of hay from each, and which has so far proved best and most reliable:—

Lot No. 1, where compost was used, produced—

In 1860,	1,170 lbs.
1861,	1,090
1862,	965
	3,225 lbs.

Lot No. 2, where leached ashes were used, produced—

In 1860,	1,120 lbs.
1861,	1,400
1862,	1,190
	3,710 lbs.

Lot No. 3, where green cow manure was used, produced—

In 1860,	1,600 lbs.
1861,	1,750
1862,	1,350
	4,700 lbs.

Lot No. 4, where dry wood ashes were used, produced—

In 1860,	1,450 lbs.
1861,	1,800
1862,	1,230
	4,570 lbs.

Lot No. 5, where Peruvian guano was used, produced—

In 1860,	1,670 lbs.
1861,	870
1862,	550
	3,090 lbs.

Perhaps a recapitulation may show more distinctly the grades of fertilization, in the following:—

The green cow manure produced	4,700 lbs.
dry wood ashes "	4,570
leached " "	3,710
compost manure "	3,225
Peruvian guano "	3,090
	19,295 lbs.

Or $9\frac{1295}{2000}$ tons.

The foregoing experiments, when commenced, were not intended for publicity. I was induced to offer the results to the society by the solicitation of several persons who had witnessed the operations in the field. Should they prove at all interesting, or of any utility to the farmer, I shall be amply repaid in the end, and doubly paid in knowing practically hereafter the best fertilizers to be used for the renovation of grass lands, or sward partially run out or otherwise.

The remarks in my former reports, of 1860 and 1861, will show the importance, in my opinion, of knowing what can best be done to promote the interests, and encourage the farmers in raising one of the most profitable as well as valuable of crops —that of hay.

The farmer of small means is often induced to worry along with an old and worn out sward, whereas had he taken it in time and used upon it but a small portion of his manure, he would have been incalculably remunerated on seeing a large crop of hay for his reward.

I hope it will not be taken amiss, when I say farmers must drop some of their old-fashioned notions of tilling the ground in this age of improvement, and strike out some new mode of production, where labor and expense can be saved, in making two blades of grass grow where only one grew before.

This subject of top-dressing reminds me of a little incident that happened while I was employed on my first experiment in top-dressing. An intelligent and practical farmer happened to be passing at the time—he asked, " Why not put that manure under the grass ? " meaning, no doubt, by turning it over. I replied it would be very expensive, as much manure would be required, as well as much labor ; and again, I could not get a good crop of hay under four years, as it would require two years to get the ground in good tilth, and two more after being seeded down to obtain a good crop. I promised to let him know the result of my experiment the next year, which I did. It was on a ten acre lot, that had not been turned over for many years; that I expended upon it about seventy-five dollars in manure of a compost kind, which was applied late in the fall of the year. In the following season, in July, I cut (first crop) nineteen tons ; in September following (second crop) six tons, making twenty-five tons on the same land on which I only cut the year before eight and one-half tons for first and second crops inclusive! Was not this experiment and result sufficient to encourage future top-dressing?

OAK HILL, SOUTH DANVERS, November 1, 1862.

EXPERIMENT ON THE ESSEX SOCIETY'S FARM.

Report of the Experiment on the Application of Manures on the "Treadwell Farm," commenced in the year 1862, *competing for the Premium, as offered by the Massachusetts Society, and also by the Essex Agricultural Society.*

Land selected, level.

Amount of land, two and one-half acres.

Quality of land, dry, not retentive of manure.

Crop of 1861, grass.

No manure in 1861.

Kind of manure used in 1862, stable manure worked over in hog-yard.

Amount, sixteen cords.

Depth of first ploughing, eight inches.

Four cords applied to lot No. 1, and ploughed eight inches deep the whole field.

Four cords applied to lot No. 2, and cross-ploughed the whole field four inches deep.

Four cords applied to lot No. 3, and harrowed the whole field twice.

Four cords applied to lot No. 4, and left exposed on the surface.

No manure to lot No. 5.

1862, May 24 to 28, planted the whole field with potatoes, three and one-half feet apart each way.

June 11th, cultivated the whole field both ways.

June 16th, 17th and 18th, hoed the whole field.

June 23d, cultivated the whole field both ways.

June 30th, cultivated the whole field both ways.

July 5th, cultivated the whole field both ways, and commenced hoeing the second time; finished July 8th.

August 25th, 26th and 27th, cleared the ground from weeds.

October 31st, finished harvesting.

The amount of potatoes on—

	large	small
Lot No. 1, . .	large, 23 bushels;	small, 42½ bushels.
2, . .	" 29	" 50
3, . .	" 16	" 46½
4, . .	" 14	" 47
5, . .	" 11	" 21
Total, . .	large, 93 bushels;	small, 207 bushels.

WEATHER REPORT FOR 1862.

	First Third.	Middle Third.	Last Third.
May, ...	–	–	1,632 in.
June, ...	1,044 in.	–	1,250
July, ...	1,632	0,952 in.	1,173
August, . . .	0,510	0,306	–
September, . .	0,246	–	0,346

EXPERIMENT COMMENCED IN 1861 CONTINUED.

Land ploughed four inches deep.

April 29th, barley sown, 5 bushels; redtop, 3 bushels; Timothy, 20 quarts; clover seed, 15 pounds.

Harvested the 1st of August.

Amount of barley—

Lot No. 1, ...	14 bushels.
2, ...	13½
3, ...	13
4, ...	13
5, ...	2
Total, ...	55½ bushels.

Amount of straw—

Lot No. 1, ...	780 lbs.
2, ...	810
3, ...	828
4, ...	905
5, ...	375

MIDDLESEX.

Statement of J. B. Farmer.

The ground on which I am trying experiments with manure, under the directions given by the society in their Transactions for the year 1861, contains three pieces, of fifty square rods each, of apparently uniform quality, though each piece differed one from the other, both in soil and subsoil. On these three pieces, I applied three different kinds of compost, and each kind was of uniform quality, while the same number of cubic feet was applied to each piece.

No. 1 is what I call a strong, sandy loam—soil about ten inches deep, with a sandy, clay subsoil, retentive of moisture, and probably of manure, but not wet and heavy.

No. 2 is a little dryer, with about the same depth of soil, and a subsoil containing more sand and less clay.

No. 3 is a light sandy loam, with a subsoil of clear sand, neither retentive of water nor manure.

The crop on the whole field in 1861 was corn. I kept an account of the number of bushels, shelled one, and found the average to be fifty-two and one-half bushels per acre. The field was ploughed in the fall of 1859, planted with corn in 1860, meadow muck carted on the following winter and thrown out in the fall, and cattle, horse and hog manure carted on in the spring of 1861; making a compost of, as near as I can estimate, three parts meadow mud, and one part cattle, horse and hog manure. This compost was spread broadcast, about seven cords to the acre, and cultivated in. Corn occupied the land in 1860 and 1861.

On the 28th of April, 1862, I subdivided each piece into five equal lots, each lot containing ten square rods, numbered according to the society's directions.

Four of the lots in No. 1 were manured with compost made of three parts cattle manure and one part meadow mud; $72\frac{5}{12}$ cubic feet to each lot. Lot No. 5 had no manure.

Four lots in No. 2 were manured with compost made of one-third meadow mud and two-thirds horse manure, on which two shotes had been kept through the winter; $72\frac{5}{12}$ cubic feet to each lot. Lot No. 5 had no manure.

Four lots in No. 3 were manured with clear meadow mud, eighty-three pounds of Coe's super-phosphate of lime being added to each cord of mud, and well worked over; $72\frac{5}{12}$ cubic feet to each lot. Lot No. 5 had no manure.

April 28th, 1862, the three different kinds of manure were applied to lot No. 1 in each range, and the whole field ploughed eight and one-half inches deep. On the 29th, lot No. 2 in each range was manured with the different kinds of composts, and the whole field again ploughed four inches deep. On the 30th, lots No. 3 were manured in the same manner, and the whole sowed with jura wheat, one and one-half bushels per acre, soaked twenty-four hours in brine so strong that the salt had not all dissolved. The wheat was dried for sowing by adding one peck of Timothy, one-half bushel of redtop and five pounds of clover to each bushel and a half of wheat, and mixing them well. The whole was harrowed in faithfully with what is here called the Pepperell harrow, and the entire field smoothed by drawing over it a slab, with the rounded side down.

May 3d, the compost was applied to lots No. 4, the rain preventing me from applying it sooner. Lot No. 5 had no manure.

The wheat came up, and looked well until the latter part of July, when I discovered, at a distance of forty rods from it, a change in its appearance. I found, on examination, the heads of the wheat literally covered with the midge, or a kind of aphis, which destroyed the whole crop in a few days, turning the straw almost black and nearly worthless, except for manure; but, desiring to obtain for you all the information in my power, I cut the straw on each lot, and having dried it well, weighed it correctly. Harvested August 5th, 1862. Annexed is the result in pounds and decimals of a pound:—

No. I.

Lot No. 1,	19.14	lbs. per square rod;		3062.4	per acre.
2,	16.83	"	"	2692.8	"
3,	18.15	"	"	2904	"
4,	14.19	"	"	2270.4	"
5,	11.715	"	"	1874.4	"

No. II.

Lot No. 1,	16.995	lbs. per square rod ;	2719.2	per acre.
2,	19,305	“ “	3088.8	“
3,	20.13	“ “	3220.8	“
4,	14.52	“ “	2323.2	“
5,	15.6816	“ “	2509.056	“

No. III.

Lot No. 1,	7.92	lbs. per square rod ;	1267.2	per acre.
2,	8.91	“ “	1425.6	“
3,	8.25	“ “	1320	“
4,	8.345	“ “	1399.2	“
5,	8.1675	“ “	1306.8	“

A brief synopsis of the weather for the months of May, June, July, August and September, 1862, has been computed, by keeping a daily journal, and comparing notes, for the first ten days in each month, then for the second ten days, then for the remainder, which makes eleven days for May, July and August, with the following result:—

	First Third.	Middle Third.	Last Third.
May, .	Moist, ground cold, drying winds.	Dry, with cold winds.	Dry, cold, windy, unfavorable to vegetation.
June, .	Moist, cool.	Rather dry, cool, windy.	Wet, after the 24th.
July, .	Moist.	Wet.	Moist, cool, much cloudy weather.
Aug., .	Wet.	Moist, no great rains.	Moist.
Sept., .	Quite moist.	Moist.	Moist.

Concord, November 1, 1862.

WORCESTER NORTH.

Statement of W. G. Wyman.

This is the final completion in 1862 of my experiment commenced in 1860, and continued in 1861, on the proper depth of applying manures, in accordance with the requirements of the Board of Agriculture. The size of the field is one acre and thirty-two square rods; the division into lots thirty-two rods each, and the number of lots the same as in 1860 and 1861. The crops, mostly clover, were harvested July 7th to 12th, and September 1st to 6th. They were mowed, one lot at a time, with common scythes, when the dew was off, then immediately weighed in the field, and when thoroughly dried the hay on No. 1 was again weighed with the following results:

	First Crop, green.	Second Crop, green.	Total.
	lbs.	lbs.	lbs.
No. 1, manure ploughed deep,	3,238	1,334	4,572
2, manure ploughed shallow,	3,078	1,754	4,832
3, manure harrowed in,	2,892	1,534	4,426
4, manure on surface,	2,788	944	3,732
5, no manure,	998	172	1,170
6, manure intermixed,	3,572	1,366	4,938

No. 1, first crop dry, 1,163 lbs.; second crop dry, 568 lbs.; total dry, 1,731. The acre that was manured produced 22,500 lbs., or 11¼ tons green hay, or 4¼ tons well dried hay.

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	moist.	dry.	moist.
June,	moist.	moist.	wet.
July,	dry.	moist.	wet.
August,	dry.	dry.	dry.
September,	dry.	dry.	dry.

FITCHBURG, October, 1862.

Statement of Albert Stratton.

I forward a report of third year's crop on the forty-five square rods of land on which I made the different application of manure, as described in the Report of 1860, also in 1861, of oat crop. August 1st, 1862, harvested good well dried hay from lot

No. 1,	288 lbs.
2,	269
3,	336
4,	345
5,	258

Lot No. 2 appeared nearly the same as No. 3 and 4, except a small portion was winter-killed or did not take well to grass.

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	moist.	dry.	wet.
June,	dry.	moist.	wet.
July,	moist.	moist.	wet.
August,	moist.	dry.	dry.

Statement of Isaac B. Woodward.

In continuance of my experiment on the application of manures, the result this past season is as follows:—

Lot No. 1, containing four square rods, where the manure was ploughed in deep, the hay when dried weighed,	130 lbs.
Lot No. 2, manure ploughed in shallow, the hay weighed,	135 lbs.
Lot No. 3, manure harrowed in, weight of hay,	136½ lbs.
Lot No. 4, manured on surface, weight of hay,	146 lbs.
Lot No. 5, without manure, weight of hay,	88½ lbs.

WEATHER.

	First Third.	Middle Third.	Last Third.
May,	dry.	dry.	moist.
June,	moist.	moist.	wet.
July,	dry.	moist.	wet.
August,	dry.	dry.	dry.
September,	dry.	dry.	dry.

My intention is to keep the stakes at the corners of the several lots, so as to know how each one holds out.

October 28, 1862.

WORCESTER SOUTH-EAST.

Statement of John G. Metcalf.

This was the first year of the experiment with manure, entered to compete for the premium of the society, to be awarded in 1863. The answers to the interrogatories set forth in the announcement of premiums for 1861, are as follows, viz.:—

1. Character of the soil,—Light, moist, not strongly retentive of manures.

2. The crop of 1860,—Potatoes.

3. The kind of manure used in 1860,—Barnyard, the manure of a horse, a cow and a hog; the hog having the run of the barnyard.

4. Amount of manure used in 1860,—Three ox wagon loads, without side boards.

5. Mode of application in 1860,—Spread upon the green sward before ploughing, and a small quantity in the hill.

6. Size of the field covered by the experiment,—One-eighth of an acre.

7. Depth of first ploughing,—Nine inches.

8. Kind of manure used in 1861,—Barnyard; made by a horse, a cow and a hog. Shovelled over twice before used.

9. Amount of manure used in 1861,—Eight ox wagon loads without side boards; estimated to be two and one-half cords.

10. Kind of crop,—Indian corn, yellow, eight to twelve-rowed, raised by A. C. Cook.

11. When planted,—May 25th.

12. How planted,—In hills, two feet and six inches apart one way, and three feet ten inches apart the other way.

13. Number of times cultivated,—Three.

14. How cultivated,—Ploughed once and hoed twice.

15. Weight of the product of corn,—Five hundred and eight lbs. shelled corn.

16. Weight of product grown upon each lot.

Lot No. 1, deep ploughed,	shelled corn,	94 lbs.
2, cross ploughed,	"	104
3, cultivated,	"	123
4, on the surface,	"	93
5, no manure,	"	94

17. Weight of product of stover,—Six hundred and one-half lbs.

18. Weight of stover on each lot.

Lot No. 1, deep ploughed,	109 lbs.
2, cross ploughed,	170
3, cultivated,	130½
4, on the surface,	104
5, no manure,	87

The following is a synopsis of the weather for the five months required.

	Mean temp.	First Third.	Middle Third.	Last Third.
May, . .	53° 20′	wet.	wet.	moist.
June, . .	66° 27′	wet.	moist.	dry.
July, . .	68° 35′	moist.	moist.	moist.
August, .	68° 90′	moist.	wet.	wet.
September, .	61° 59′	moist.	wet.	dry.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of Levi Stockbridge.

1860. Having entered my name on the list of competitors for the premium offered by you for the best experiment to ascertain the right method of applying manure, I present the following as the result of that experiment.

I selected one and one-half acres for the experiment, of a light, sandy loam soil, which was mown in 1858 and 1859, without any application of manure. It was divided into five equal parts, on four of which a compost was applied at the rate of twenty loads per acre. The directions of your circular were complied with respecting the ploughing and the planting, and the after cultivation was to hoe and cultivate it three times. On lot No. 1 the manure was ploughed in eight inches ; No. 2, ploughed in four inches ; No. 3, harrowed in ; No. 4, spread on the surface, after planting; No. 5 had no manure. It was planted with Indian corn. The crop was cut and stacked the 22d of September, husked the 28th and 29th of October, and shelled the 4th of January.

The yield was as follows : Lot No. 1—12 bushels, 4 quarts, 1 pint, yielding 17 quarts, 1 pint, 3 gills of shelled corn to the bushel of ears, and weighing 59 pounds per bushel; this yield was 40 bushels, 15 quarts per acre. No. 2—9 bushels, 31 quarts ; a bushel of ears gave 18 quarts of shelled corn, and weighed 61¼ pounds per bushel ; this yield was 33 bushels, 13 quarts per acre. No. 3—9 bushels, 29 quarts, giving 19 quarts of shelled corn to a bushel of ears, and weighing 61¼ pounds per bushel ; this yield was 33 bushels per acre. No. 4—8 bushels, 14 quarts, 1 pint, yielding 18 quarts, 1 pint of shelled corn to a bushel of ears, weighing 60¼ pounds per bushel; this yield was 28 bushels, 5 quarts per acre. No. 5—7 bushels, 5 quarts, 1 pint, giving 16 quarts, 1 pint shelled corn to a bushel of ears, and weighing 58¼ pounds per bushel; this yield was 23 bushels, 29 quarts per acre. The corn on No. 1 weighed 2,400 pounds per acre, and the stalks on the lot weighed 940 pounds. The corn on No. 2 weighed 2,050 pounds per acre, and the stalks on the lot weighed 900 pounds. The corn on No. 3 weighed 2,021 pounds per acre, and the stalks on the plot weighed 760 pounds. The corn on No. 4 weighed 1,696 pounds per acre, and the stalks on the plot weighed 544 pounds. The corn on No. 5 weighed 1,407 pounds per acre, and the stalks on the plot weighed 740 pounds.

It was my endeavor to be exact in every thing relating to the experiment, that the result might be reliable.

1861. I herewith transmit to you the result of my experiment with manures for the second year. The lot was ploughed the 15th of April, to the depth of eight inches, and sown the 16th to wheat. The crop was very good, but the berry was not so plump and heavy as usual. The yield was as follows: Lot No 1, (manure ploughed in eight inches,) yielded 4 bushels, 28 quarts, 2 gills; or 16 bushels, 8 quarts, 1 pint, 2 gills per acre, weighing 56 pounds per bushel; the straw weighed 261 pounds, or 880 pounds per acre. Lot No. 2, (manure ploughed in four inches,) yielded 4 bushels, 25 quarts, 1 pint, 3 gills; or 16 bushels, 1 pint per acre, weighing 57 pounds per bushel; the straw weighed 216 pounds, or not quite 800 pounds per acre. Lot No. 3, (manure harrowed in,) yielded 4 bushels, 25 quarts, 1 pint, 3 gills; or 16 bushels, 1 quart, 1 pint per acre, weighing 57 pounds per bushel; the straw weighed 237 pounds, a little less than 800 pounds per acre. Lot No. 4, (manure spread on the surface,) yielded 5 bushels, 3 quarts, 1 pint; or 17 bushels, 1 quart per acre, and weighed 57 pounds per bushel; the straw weighed 240 pounds, or 800 pounds per acre. No. 5, (no manure,) yielded 4 bushels, 2 quarts, 1 pint, 1 gill; or 13 bushels, 19 quarts, 3 gills per acre, weighing 53 pounds per bushel, the straw weighing 219 pounds, or about 700 pounds per acre.

WEATHER.

	First Third.	Middle Third.	Last Third.
April, ...	moist.	wet.	moist.
May, ...	moist.	wet.	moist.
June, ...	moist.	dry.	dry.
July, ...	dry.	moist.	moist.
August, . . .	moist.	wet.	moist.

P. S. It was harvested the 6th of August, and threshed the 17th.

1862. I herewith forward to you the result for the third and last year of my experiment on the application of manures, for the premium offered by your society in 1860, for which I am a competitor. The land was in grass this year, Timothy and clover, and was mown the 8th and secured the 10th of July.

No. 1,	yielded	825 pounds,	or 2,750 pounds per acre.
2,	"	694	or 2,313 "
3,	"	643	or 2,147 "
4,	"	544	or 1,813 "
5,	"	487	or 1,582 "

WEATHER.

	First Third.	Middle Third.	Last Third.
April, ...	moist.	dry.	moist.
May, ...	dry.	dry.	dry.
June, ...	dry.	dry.	moist.
July, ...	wet.	wet.	moist.
August, . . .	moist.	moist.	moist.

The value of the crop grown upon each plot of land during the experiment, estimating corn at seventy-five cents per bushel, stalks at $5 per ton, wheat at $1.50 per bushel, straw at $7 per ton, and hay at $10 per ton, was as follows :—

No. 1.		No. 2.	
Corn, . . .	$9 32	Corn, . . .	$7 65
Stalks, . . .	2 35	Stalks, . . .	2 25
Wheat, . . .	7 50	Wheat, . . .	7 38
Straw, . . .	91	Straw, . . .	75
Hay, ...	4 12	Hay, ...	3 47
Total value, .	$24 20	Total value, .	$21 50

No. 3.

Corn, . . .	$7 60
Stalks, . . .	1 90
Wheat, . . .	7 38
Straw, . . .	82
Hay, ...	3 21
Total value, .	$20 91

No. 4.

Corn, . . .	$6 49
Stalks, . . .	1 36
Wheat, . . .	7 84
Straw, . . .	$0 84
Hay, ...	2 72
Total value, .	$19 25

No. 5.

Corn, . . .	$5 40
Stalks, . . .	1 85
Wheat, . . .	6 27
Straw, . . .	54
Hay, ...	2 43
Total value, .	$16 49

North Hadley, October 21, 1862.

NORFOLK.

Statement of Charles Breck.

In continuation of my experiment with manure, commenced in 1861, I have to state the rye sown last fall was cut July 29, 1862, and was threshed August 6th. The grain and straw were carefully weighed, and the result was as follows :—

	Weight of grain.	Weight of straw.	Amount per acre of grain.	Amount per acre of straw.	Value per acre of grain at 90 cents.	Value per acre of straw at 70 cents per 100.	Total per acre.
	lbs.	lbs.	bushels.	lbs.			
No. 1, . .	38½	70	27½	2,800	$24 75	$19 60	$44 35
2, . .	37	72	26.43	2,880	23 78	20 26	44 04
3, . .	29½	51	20.85	2,040	18 76	14 28	33 04
4, . .	28	47½	20.	1,900	18 00	13 30	31 30
5, . .	9	21½	6.43	860	5 78	6 02	11 80
6, 7, and 8,*	28.66	46.83	20.48	1,973	18 43	13 81	32 24
9, . .	30	52	21.43	2,080	19 28	14 56	33 84

* Average.

1861.	Profit on	No. 1	above cost of manure,	$18 97	
1862.	“ “	No. 1	“ “ “	32 55	—$51 52
1861.	“ “	No. 2	“ “ “	22 73	
1862.	“ “	No. 2	“ “ “	32 24	—54 97
1861.	“ “	No. 3	“ “ “	13 76	
1862.	“ “	No. 3	“ “ “	21 24	—35 00
1861.	Loss “	No. 4	“ “ “	23 96	
1862.	Profit “	No. 4	“ “ “	19 50	—4 46*

* Loss.

SYNOPSIS OF THE WEATHER.

	First Third.	Middle Third.	Last Third.	Average of Thermometer.	
May, .	Moist,	Dry,	Dry,	58.25°	Or about $2\frac{3}{4}$° warmer than the average for ten years.
June, .	Moist,	Dry,	Moist,	63.83°	Or about $2\frac{1}{2}$° colder than the average.
July, .	Dry,	Moist,	Wet,	68.75°	Or about $2\frac{1}{2}$° colder than the average.
Aug., .	Moist,	Dry,	Moist,	68.93°	Or about 1° warmer than the average.
Sept., .	Moist,	Moist,	Moist,	62.88°	Or about the average.
				63.66°	Average of the five months, 1862.
				64.53°	Average of same, 1861.

Statements of Aaron D. Weld.

I submit my report for the year 1862, the first of this series.

A level piece of land, containing one hundred square rods, was selected for the purpose, and divided into five lots of twenty square rods each. The soil is composed of black peat mud, has been down to grass seven years, and was ploughed last fall.

This spring it was ploughed and the manure applied according to the requirements of the State Board of Agriculture, precisely in the same manner and quantity as in my report on experiments with manures, in 1861, to which reference is had on pages 148 and 149 of the Agriculture of Massachusetts for that year. It may be proper to state that the cut-worm again attacked the lots on which we were experimenting, which prevented a larger quantity to estimate upon.

Well-rotted stable manure was used at the rate of six cords to an acre.

May 17th the whole piece was planted with corn, five hundred and six hills in each lot. Cultivated and hoed the field June 11th and July 2d. September 23d the corn was cut up and shocked, and one row in each lot, being twenty-two hills, was set aside to estimate upon.

October 24th the corn was husked and weighed, and a part shelled with the following estimated result:—

ACTUAL WEIGHT OF ONE TWENTY-THIRD OF EACH LOT. CALCULATIONS FOR 1862. TWENTY RODS—ONE-EIGHTH OF AN ACRE.

Lot No. 1,	75 lbs. corn and stalks,		13,800	lbs. per acre.
2,	90	" "	16,560	"
3,	70	" "	12,880	"
4,	75	" "	13,800	"
5,	35	" "	6,440	"

CORN IN EAR.

Lot No. 1,	35 lbs.,	. . .	6,440	lbs. per acre.
2,	44	. . .	8,096	"
3,	36	. . .	6,624	"
4,	35	. . .	6,440	"
5,	21	. . .	3,864	"

STOVER.

Lot No. 1,	40 lbs.,	. . .	7,360	lbs. per acre.
2,	46	. . .	8,464	"
3,	34	. . .	6,256	"
4,	40	. . .	7,360	"
5,	14	. . .	2,576	"

CORN SHELLED.

Lot No. 1,	26 lbs.,	. . .	$85\frac{24}{56}$	bush. per acre.
2,	33	. . . .	$108\frac{24}{56}$	"
3,	27	. . . .	$88\frac{40}{56}$	"
4,	26	. . . .	$85\frac{24}{56}$	"
5,	16	. . . .	$52\frac{32}{56}$	"

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	wet.	moist.	moist.
June, ...	wet.	moist.	wet.
July, ...	wet.	wet.	moist.
August, ...	wet.	moist.	moist.
September, . . .	moist.	wet.	moist.

The land on which the above experiments were made is what I call my meadow lot, lying northerly from my barns and just below them.

WELD FARM, WEST ROXBURY, December 24, 1862.

CHEEVER NEWHALL, Esq., *Chairman, &c.* :—

Dear Sir,—I refer you to my last report—"Experiments on Manures"—pages 149 and 150 of the Report of 1861, for the land, soil, and experiments of that year. On page 149 it will be noted that the land was sown to winter rye and Timothy grass seed September 20, 1861—about five pecks of rye and a fraction over one bushel of Timothy grass seed to the acre.

The rye was cut and shocked July 18th; weighed the whole and threshed it August 12th, and winnowed it August 16th—all of which was carefully weighed on Fairbanks' Standard Scales on my farm, with the following results:—

TWENTY RODS OR ONE-EIGHTH OF AN ACRE TO EACH LOT.

LOTS.	Rye and Straw, lbs.	Rye cleaned, lbs.	Straw, lbs.	Rye, per acre, bushel.	Straw, per acre, tons.
No. 1, ...	640	195	445	27.48-56	1.1560
2, ...	770	251	519	35.48-56	2.0152
3, ...	740	247	493	35.16-56	1.1944
4, ...	730	250	480	35.40-56	1.1840
5, ...	620	198	422	28.16-66	1.1376
6, ...	1,120	360	760	51.24-56	3.0080

You will now note that lots Nos. 1, 2, 3 and 4 had each six feet of well-rotted manure. No. 5, no manure; and in reference to my last report, No. 6 had two feet of compost applied in the hills, and a top-dressing of six feet of additional composts when laid down last fall.

No. 1 was spread and the whole piece ploughed eight inches deep.

No. 2 was then spread, and the whole piece cross-ploughed four inches deep.

No. 3 was spread and the whole piece harrowed.

No. 4. Same ploughing as above and manure spread on surface after planting.

No. 5. Same ploughing and no manure.

No. 6 like No. 3, except the application of about two feet of compost to the hill, and six feet of top-dressing last fall, at time of seeding down, as before stated.

RESULT PER ACRE FOR TWO YEARS.

LOTS.	1861.		1862.	
	Shelled Corn, bushel.	Stover, tons.	Cleaned Rye, bushel.	Straw, tons.
No. 1, ...	68	7.1240	27.48-56	1.1560
2, ...	80.48-56	8.1544	35.48-56	2.0152
3, ...	74.48-56	7.1408	35.16-56	1.1944
4, ...	59.12-56	7.0160	35.40-56	1.1840
5, ...	49.12-56	4.1912	28.16-56	1.1376
6, ...	74.48-56	7.0064	51.24-56	3.0080

WEATHER.

	First Third.	Middle Third.	Last Third.
May, ...	wet.	moist.	moist.
June, ...	wet.	moist.	wet.
July, ...	wet.	wet.	moist.
August, ...	wet.	moist.	moist.
September, . . .	moist.	wet.	moist.

WELD FARM, WEST ROXBURY, December 24, 1862.

PLYMOUTH.

Report of Spencer Leonard, Jr., on Experiment in the application of Manures, commenced in 1860, *for the year* 1862.

Having entered as a competitor for the premium offered for an experiment in the application of manure, commencing in 1860, and closing in 1862, I will endeavor to give you the result of the experiment.

The weather while the hay crop was growing in the field was nearly as follows:—

	First Third.	Middle Third.	Last Third.
May, ...	dry.	dry.	dry.
June, ...	wet.	moist.	moist.
July, ...	moist.	dry.	dry.

The grass was cut July 8, 1862, and was a mixture of clover, honeysuckle and blue grass, and when it was well cured it weighed as follows:

Plot No. 1, 150 lbs.; No. 2, 172 lbs.; No. 3, 167 lbs.; No. 4, 175 lbs.; No. 5, 88 lbs.

As you have had a statement of the mode of cultivation for two years last past, I will now merely give you an account of the amount of the produce of each plot, with its estimated value for each of the three years. Corn is valued at $1 per cwt. on the ear, corn fodder and straw at 40 cents per cwt., barley at 75 cents per bushel, and hay at $14 per ton, in the following estimate:—

Plot No. 1.

1860, 382¾ lbs. corn, ...	$3 83	
346 lbs. stover, ...	1 38—	$5 21
1861, 1 bushel 4 qts. barley, . .	85	
63 lbs. straw, ...	25—	$1 10
1862, 150 lbs. hay, ...		1 05
Total value of plot, for three years, . .		$7 36

Plot No. 2.

1860, 407 lbs. corn, ...	$4 07	
330 lbs. stover, ...	1 32—	$5 39
1861, 1 bushel 9 qts. barley, . .	96	
75 lbs. straw, ...	30—	$1 26
1862, 175 lbs. hay, ...		1 20
Total value of plot, ...		$7 85

Plot No. 3.

1860, 321¾ lbs. corn,	$3 22	
274 lbs stover,	1 10—	$4 32
1861, 1 bushel 5 qts. barley,	87	
64 lbs. straw,	26—	$1 13
1862, 167 lbs. hay,		1 17
Total value of plot,		$6 62

Plot No. 4.

1860, 321½ lbs. corn,	$3 22	
232 lbs. stover,	93—	$4 15
1861, 1 bushel 4 qts. barley,	85	
64 lbs. straw,	26—	$1 11
1862, 175 lbs. hay,		1 22
Total value of plot,		$6 48

Plot No. 5.

1860, 234½ lbs. corn,	$2 35	
136 lbs. stover,	54—	$2 89
1861, 24 qts. barley,	56	
39 lbs. straw,	16—	72
1862, 88 lbs. hay,		62
Total,		$4 23

By the above it would appear that plot No. 2, where the manure was cross-ploughed in, afforded the greatest value of crops in the three years; while plot No. 4, with the manure placed upon the surface, produced the most hay this year. The amount of manure, as you will recollect, that was applied to each plot of twelve rods, was two cart loads, or a trifle more than half a cord, and each plot bears ample evidence that manure, however applied, tends to increase the amount of produce, and that therefore we should use every exertion to increase the amount and quality of our manure, if we would add to the value of our crops.

BRIDGEWATER, September 30, 1862.

Report of Spencer Leonard, Jr., on Experiment made in application of Manure, commencing in 1861, *for the year* 1862.

Having entered as a competitor for the premium offered for an experiment in the application of manure, commencing in 1861 and closing in 1863, I will give you the result of this year's operation.

You may recollect from the statement of last year that the corn was taken off, and the ground sowed to rye, September 13, 1861. The rye came up well, and looked very even and of good color this spring. The rye was cut and shocked about the middle of July, and was taken in and threshed about the first of August, and produced as follows:—

Plot No. 1, . .	rye, 107 lbs.;	straw, 180 lbs.
2, . .	" 90½	" 145
3, . .	" 89	" 140¾
4, . .	" 96¾	" 173¾
5, . .	" 63¾	" 136¾

The rye being cut early was light colored, and of good quality, producing, where the manure was put, nearly 23 bushels to the acre. The grass seed was sown upon the ground in March, came up well, and now looks finely, excepting where there was no manure put—that looks rather poorly.

The weather, while the crop was in the field, was nearly as follows:—

	First Third.	Middle Third.	Last Third.
May, ...	dry.	dry.	dry.
June, ...	wet.	moist.	moist.
July, ...	moist.	dry.	dry.

Bridgewater, September 30, 1862.

Report of Spencer Leonard, Jr., on Experiment in the application of Manure, commencing in 1862, *for the year* 1862.

Having entered as a competitor for the premium offered for an experiment in the application of manures, commencing with 1862, I will give you the result of the first year's operation.

The lot selected contains fifty square rods, is of very even quality, and might properly be called a moist, sandy loam; has been in grass five years, without any top-dressing; producing the last two years, about three-fourths of a ton of hay per acre, each year. About the middle of May, this year, it was divided into five parts, and stakes put down at each corner, each plot containing ten square rods.

Upon Plot No. 1, two cart loads (containing 35 cubic feet each) of good manure from my barn-cellar were evenly spread upon the surface, and the whole lot well ploughed about seven inches deep; then the same quantity of manure, and of like quality, was spread upon Plot No. 2, and the whole lot cross-ploughed to the depth of about four inches; upon Plot No. 3 the same kind and quantity of manure was spread, and the whole well harrowed and marked off for planting, three feet five inches apart each way. The same amount and quality of manure was then spread upon Plot No. 4, and the whole lot was then planted (May 21st) with an eight-rowed yellow corn called in this vicinity the Alden corn. The corn came up very even, Nos. 2 and 3 soon taking the lead and keeping it through the season. The after cultivation was all alike, which was to run a common horse cultivator through it four times, and it was hoed twice. September 20th, the corn was cut and shocked, care being taken to keep each lot separate. The ground was then ploughed, and sowed to rye. October 20th, the corn was taken in and husked and weighed as follows:—

Plot No. 1, . .	corn,	257 lbs.;	stover,	177 lbs.
2, . .	"	286	"	102
3, . .	"	277	"	194
4, . .	"	242	"	169
5, . .	"	165	"	105

The weather, while the crop was in the field, was nearly as follows:—

	First Third.	Middle Third.	Last Third.
May, ...	dry.	dry.	dry.
June, ...	wet.	moist.	moist.
July, ...	moist.	dry.	dry.
August, ...	wet.	moist.	moist.
September, ...	dry.	moist.	wet.

I have not tried to see how much corn I could raise, but have taken about an average of our Plymouth County soils and applied the amount of manure which I should think would be economical for general cultivation, kept the ground well stirred and free from weeds, and the result has been as above. It will be seen that Plot No. 2, where the manure was ploughed in four inches, on land previously ploughed seven inches, produced about three per cent. more than where it was harrowed in, about twelve per cent. more than where it was ploughed in deep, about eighteen per cent. more than where the manure was left upon the surface, and about seventy-three per cent. more than the plot without any manure. The season has proved moist, which would appear to be favorable to the plots where the manure was near the surface.

BRIDGEWATER, November 10, 1862.

TREES AND SHRUBS.

NORFOLK.

Statement of G. & C. Craft.

The following statement is furnished respecting such varieties of evergreen trees and shrubs as have been cultivated and tested by us. The land upon which most of the trees grow, lies rather low and level; the soil is a strong, black loam, not very deep, with a yellow subsoil, resting on hard-pan gravel, about eighteen inches from the surface. We never apply manure to evergreens. The newer kinds are sheltered somewhat, by standing in the nursery, among larger trees, both deciduous and evergreen. Some of the kinds—especially those that are very common and well known—will be passed over without remark; such as the white and pitch pines, balsam fir, white or swamp cedar, and the savin or red cedar; and where nothing is stated to the contrary with regard to any variety, it may generally be considered as perfectly hardy. This class embraces such trees as the Scotch Pine, *Pinus sylvestris;*

Austrian, *P. Austriaca;* Norway or Red, *P. rubra;* Cembrian, *P. Cembra;* Corsican, *P. laricio;* Pyrenian, *P. Pyrenaica;* Jersey, *P. inops;* Dwarf or Mountain, *P. pumila;* which grows about four or five feet high. The Lofty or Bhotan, *P. excelsa*, has been in our grounds several years, and we have some fair, though not large specimens of this splendid tree. Our summer sun sometimes causes its leading shoots to die back, especially when the growth is very luxuriant. Perhaps this habit might be *starved out*, by growing the tree in a poor, gravelly soil. The larva of the white pine weevil, (*Rhynchoenus strobi*,) often kills the leader of this tree, as well as that of the white pine, Norway spruce, and others, rendering them unsightly for a season or two. Whenever a shoot is observed to wither, it should immediately be cut off, below the injured part, and burnt before the grub makes his escape.

Norway Spruce, *Abies excelsa;* Black or Double American, *A. nigra;* White American, *A. alba;* Lord Clanbrasil's dwarf Norway Spruce, *A. excelsa Clanbrasiliana*, grows about three feet high—very bushy and compact. Another dwarf variety is *A. e. pygmaea*, which grows only a foot or so in height, but spreads very much. American hemlock, *A. canedensis*. Of these we exhibited cuttings of four varieties, three of which are chance seedlings. Ground Hemlock, *Taxus canedensis*. The Hemlock needs the protection of other evergreen trees for the first three or four years after having been planted in localities exposed to the influence of the sun or the wind. The Norway spruce, Balsam Fir, the Scotch, Austrian or White Pine, are all excellent nurse trees for this purpose. Simply tieing in the branches of young evergreens, before winter sets in, is not only a protection from the rigors of winter, it also prevents injury from snow and ice. The Himalayan Fir, *A. Smithiana*, is invariably cut down to the snow line in winter. Our trees—about a dozen—which were planted some eight years ago, still live, but their growth being chiefly lateral, they have become a sort of low, scragged hedge. European Silver Fir, *Picea pectinati*, makes rather slow upward progress for three or four years, but afterwards grows rapidly, and becomes a lofty and perfectly hardy tree. Siberian Silver, *P. pichta*, and Noble Silver, *H. nobilis*, are both said to be perfectly hardy; our plants have stood well for two winters, but as they are only eight or ten inches high, we cannot, without further trial, pronounce upon their hardiness.

Swedish Juniper, *Juniperus swecica*, stands very well in a sheltered spot. Irish, *J. Hibernica*, is not quite so hardy as the former species. The Chinese, *J. Chinensis;* Cypress-leaved, *J. sabina cupressiana;* Tamarisk-leaved, *J. s. tamariscifolia;* Variegated-leaved, *J. s. variegata;* and Scaly-leaved, *J. squamata*, have all stood out-doors several winters, and, thus far, promise well. Weeping, *J. recurva*, died the second winter, although carefully protected. The Prostrate Juniper, *J. communis*, though looked upon as "a troublesome shrub, and useless for ornament," yet when properly trained to a trellis, or arbor, forms a dense and beautiful screen of perpetual verdure. It is extremely hardy, and may be pruned so as to occupy but little more space than a board fence—a very desirable quality where land is valuable, or where the necessary room is lacking in which to use other trees or plants.

The Deodar Cedar, *Cedrus deodara;* Cedar of Lebanon, *C. Libana;* Japan Cedar, *Cryptomeria Japonica;* and Chili Pine, *Araucaria imbricata*, have all disappointed the strong hopes entertained a few years since, that these trees might be acclimatized.

Arbor Vitæ, *Thuja occidentalis.* This tree, though indigenous in a locality having a more austere climate than ours, has frequently suffered, of late, in this vicinity. Various are the causes which have been assigned for this calamity; all of them, however, seem to lie beyond human control. The Siberian, *T. Siberica*, is very hardy, and keeps its color pretty well in winter. Plaited-leaved, *T. plicata.* Hovey's, *T. Hoveyi*, has been in our grounds but one winter. It has beautiful foliage, and holds its color well; the tree is doubtless perfectly hardy. Weeping, *T. pendula*, is said to stand the coldest winters and hottest summers; but our plants being few and small, and having rather an exotic look, we have not yet ventured to trust them without some protection in winter. Chinese, *T. orientalis*, does not stand well, though in a sheltered spot. Golden, *T. aurea.* This exquisite little gem cannot be made to stand our winters with any reasonable amount of petting and coaxing. As the trees are small, and very pretty, it is worth while to have a specimen or two. We take ours up every autumn—

three or more can be packed in a common soap box—and put them in the cellar, and in spring set them out again in the open border. In this way they succeed admirably. Gigantic, *T. gigantea; Taxodium sempervirens;* and Mammoth tree of California, *Washingtonia gigantea*, are three giants of the forest; growing—one one hundred and forty feet, another two hundred to three hundred feet, and the last named, four hundred and fifty feet high. These all get sadly cut up every winter, though well protected by evergreen boughs. They recover somewhat in summer, and then grow rapidly; but the prospect that they will ever become acclimated, appears very dubious. Broad-leaved, *Thuiopsis Borealis*, is a new and very beautiful variety; a rapid grower, ultimately reaching, it is said, an altitude of one hundred feet. Our specimens have stood out three winters, wholly unprotected, with complete success; every sprig seeming to retain throughout the year the fresh verdancy of summer.

English Yew, *Taxus baccata;* do. *pyramidalis;* Irish, *T. Hibernica;* Striped, *T. elegantissima.* The last named variety has stood with us; the others have succeeded but indifferently, except when planted on a sheltered mound.

Lawson's Cypress, *Cupressus Lawsoniana*, is another new evergreen tree, of a remarkably elegant and striking appearance. We have had it but a short time. Very favorable accounts respecting its hardiness, &c., near Boston, are given by those who have had it out several winters. Deciduous Cypress, *C. distichum*, is not an evergreen, though, like the Larch, it is closely allied to the pine family. It succeeds perfectly, even in exposed situations.

American Holly, *Ilex opaca*, is a slow grower—gets browned by the sun in winter and spring, when standing in an open spot, unless protected. A few years ago we received from England some beautiful Holly plants. There were two varieties —Dahoon, *I. scotica*, and Laurel-leaved, *I. laurifolia;* they went through one or two winters, with protection, very well, but are now nearly used up. The roots are alive, but the tops have only a few scattering leaves remaining.

Kalmia latifolia, *K. angustifolia* and *K. myrtifolia*, stand well; also Rhododendron, *maximum*, *Catawbiense*, *punctatum*, *ferrugineum strictum*, *hirsutum*, *purpureum grandiflorum*, *Everastianum*, and other varieties.

Gold-edged Tree Box, Striped-leaved do., and Dwarf Box, thrive better if slightly covered in winter.

Holly-leaved Berberry, *Mahonia aquifolia;* Cluster-Flowered, *M. fascularis hybrida*, and Creeping, *M. repens*, all do best in the shade, or where shielded from winter sun; otherwise the foliage gets scorched. Cotoneaster *buxifolia*, also requires similar management.

Ink Berry, *Prinos glaber*, gets discolored with us every winter. Probably the elegance of its foliage would be retained in a more sheltered place.

The above list comprises about all the evergreens which we have had under cultivation; it probably embraces more varieties than we exhibited, but as we did not expect to prepare any statement concerning them, we kept no list of the kinds.

Walnut Hills, Brookline, November 17, 1862.

PLYMOUTH.

Report of the Committee.

Forest Trees.—There were six entries for the premium on forest trees payable this year, of which two have been withdrawn. Dr. Morton's plantation of white pines is comparatively small, but shows much order and system in planting, the trees being in straight rows, averaging seven to eight feet apart, well filled, there being few vacancies. The pines, planted in 1848, are about twenty-five feet high, and will, perhaps, average at the ground one foot in diameter. Mr. Brewster's enclosure consisted of twelve acres of a former barren waste, now covered with a young and thifty growth of white pines. No system has been observed here, and to all appearance, to the eye of a superficial observer, nature would seem to have employed her agencies in sowing this tract of land. The seed partially failing, young trees were set out, filling up the vacancies, without regard to distance or to the uniformity of size in the young trees.

The tortrices, or the turpentine fly, has affected the leaders of many of the trees, notwithstanding the efforts of the cultivator in cutting off the diseased shoots. As the injuries to our forests of pine, from the attacks of this fly, are annually becoming more and more serious, and the subject has as yet caused but little investigation, and seems imperfectly understood, it may be stated that these tortrices appear late in the fall, something in the form of the well known "codling moth," and pierce the tender shoots, and terminal buds, depositing a number of eggs, which in due time become worms. Their depredations soon become known by the oozing of the resin, and by the withering of the entire shoot. This soon dies, and the upward growth of the tree is checked. The ensuing season, one of the lateral branches of the previous year's growth begins to turn upward, and in course of time becomes the leader, giving the trunk an irregular and crooked appearance, injuring it for timber. As soon as a diseased appearance is manifested in the shoot, it should at once be cut off, and by opening will be found full of worms. Commit to the fire all such branches, otherwise each worm will change into a chrysalid, and soon after turn into a perfect state, ready to lay eggs for another generation of worms. All efforts for eradicating the evil are abortive unless a thorough and systematic course is pursued annually, of cutting off and destroying the diseased shoots before the worms leave them, which is usually the latter part of August.

Mr. Copeland has about fourteen acres, more or less, covered with white pines of various sizes, most of them transplanted since 1850. The committee noted with regret numerous vacant places, where the young trees had died, and had not been renewed. It is to be recommended that the distance apart each way never should exceed eight feet, and when vacancies occur, let them be filled by new trees, before endeavoring to extend the plantation.

Mr. Jairus Howland, of Pembroke, entered claims as a competitor on forest trees, and subsequently the plantation changed hands; the entry, however, not being withdrawn, the committee visited the grounds, and found much to deprecate and nothing to praise. It appears that some time since, the proprietor, falsely thinking to improve one of the most thrifty growths of pines in the county, cut off the lower branches and trimmed up the trees. We don't mean dead branches, but the green, living boughs—the life and soul of the tree—thus barbarously thinking to improve upon nature. The result is a disfigured plantation. Most of the trees are stunted and diseased, and many dead, while the entire lot is put back at least five years. The committee not only withhold a premium, but censure, in the highest terms, the practice of trimming and cutting off any of the living growth of evergreens.

It is to be regretted that attempts have not been made to grow the oak, locust and other trees suitable for ship-timber. It is now the universal practice in England, where much attention is paid to the production of timber, to plant land in pines and acorns together. The advantage in so doing is, that the pines distroy the coarse grass and brambles, which frequently choke and injure oaks, and the young trees being shaded and sheltered, scarely one so planted fails. It is necessary from time to time to give air and light to the oaks by thinning, &c., as occasion may require. When acorns are planted, it should be immediately after they have dropped from the tree, and the depth of planting not more than half an inch. No mode of depositing acorns in the soil can be worse than that of dropping them into holes and burying them several inches deep. Few trees promise better as a cultivated forest tree, than the locust. Its extremely rapid growth, its well known properties as timber, and its use to the farmer for its indestructible property, commend it very strongly.

In large plantations of the locust, it has been discovered that the worms, which generally injure this tree so much, cease their ravages and only those trees which form the outskirts, exposed to the air and sun, suffer from them. The conclusion is, that the parent of the worm avoids the shade of the woods and leaves the interior of the plantation free from its attacks.

We have a vast deal of waste land, throughout the county, which is too rough for the plough, too sterile for grazing, but is just suitable to the growth of timber. The cultivation of forest trees requires as much skill and knowledge as that of fruit trees. In the first place we should know how and when to save and when to sow the seed of our forest trees, and should understand what trees are best adapted to our soil. Ornamental trees often fail from a want of knowledge of this latter point. Generally, if a man fancies a particular kind of tree, he transplants it to his grounds, without any regard to the adaptation of the soil to its growth. In the matter of sowing seeds, we must follow Nature as closely as possible, and get the seeds when they are in a right condition to sow.

The oak and chestnut ripen in the autumn when the frosts bring their fruit to the ground. The pitch-pine ripens any time during the winter, the white-pine in August; the yellow and black birch in July; the elm and maple in June, and the sugar maple in August and September.

A great cause of failure, is want of knowledge in saving the seed and also in covering it too deep, or planting tender trees where they will be exposed to a burning sun. Nearly all trees will fail to thrive if planted in exposed or bleak situations. They should be put where they will be shaded or sheltered by thick planting. With reference to white pines, it is found to be better, being more certain and satisfactory, to transplant than to sow the seed. The trees should be removed early in June, or when the new growth is about one-half to an inch in length, and the trees about one foot high.

In conclusion, we earnestly recommend our Plymouth County farmers to abandon the practice of endeavoring to raise crops of grain and grass on barren plains, where scarcely any returns are yielded. Convert such land into pine plantations, for it is just the soil they thrive best upon, and you will soon enhance the value of your farms, and leave a rich inheritance to your children.

The committee respectfully suggest that one thousand trees are, in their opinion, too many to grow profitably on an acre of land, especially of the white pine. They recommend the standard should be lowered to eight hundred trees, thereby giving the distance apart each way about seven feet.

MARTIN BRYANT, *Chairman.*

Statement of Philip Brewster, of Hanson.

The lot of forest trees, on which I claim the society's premium, contains about twelve acres. I commenced planting white pine seed in the year 1850; not being very successful, I abandoned it, and commenced transplanting in the year 1853, and continued it for three years, filling up the vacant places in the months of May and June. I think I succeeded best in transplanting. It will do to transplant any time in the months of May or June.

Statement of Dr. Cyrus Morton, of Halifax.

The lot of pine trees, that I have entered for a premium, I commenced planting in the spring of 1848 ; the last I planted in 1856. The ground on which these trees are growing is gravelly and unproductive. The first I planted was on land that would produce nothing but mullein and tinkham weed ; indeed, my object was to have something growing to hide the nakedness of the land. I at first planted some three or four hundred, the latter part of May. I found not one in twenty of these died ; in October following, I planted a few hundred more. I went through the same process with them, and nineteen out of twenty died. I find by this experiment that the time for planting evergreens is in the spring, late, say the last of May ; for since then I have taken that time to plant them, and have invariably been successful. My modus operandi is to furrow the ground in the same manner as for planting corn, only wider apart. I select trees of three of four years' growth. I think these are as sure to live and I get the start a few years in the growth. I get the trees from our old pastures where they are exposed to the sun. If taken from the woods where they grow in the shade, if they live, they will be stinted, and it will take two or three years to get them acclimated. I take them up with a shovel, and the small roots of the pine are so numerous that you can handle them roughly and not detach the soil from them. I have no data at which I can arrive at the expense per acre for planting. It depends altogether whether you get the trees near by your lot, or at a distance. The last half-acre I planted I got my trees in an adjoining pasture. My hired man with a horse furrowed the ground, and with a horse and wagon collected the trees and planted them in one day, so the whole expense for planting that half-acre did not exceed two dollars. Since planting I have done nothing to the lot, or the trees, only to keep it fenced to prevent injury from cattle. I measured some trees of the first planting that are more than twenty-five feet high and girting nearly three feet at the surface of the ground; of the last planting, some are twelve feet high, and one foot in circumference. I find they have grown so fast that they not only answer the purpose for which I first planted them, that is to hide the nakedness of the land, but they bid fair to be a source of profit; at any rate, they are "a thing of beauty," and I enjoy the consciousness of being the means of producing a thrifty growth of forest trees on land so barren and unproductive it would not pay to fence it. You will see by the surveyor's certificate that I have two acres and thirty-one rods of land on which are twenty-eight hundred and sixty-five trees in a flourishing state.

Statement of Jonathan Copeland, of West Bridgewater.

The tract of land planted and transplanted to forest trees, which I entered for the society's premium, payable in 1856, was high, poor land, and had been exhausted by frequent croppings. In the fall of 1847 I sowed the land to rye; had a small crop. In 1848, in February, I sowed pine seed, procured the fall before, and also sowed again the first of April on the rye; neither sowing came up well. The seed sown in April came up best. I then, in 1850, went to transplanting white pine and some white birch. In 1857 we planted one acre, in November. They nearly all lived and have made good growth since. In 1858 we planted two acres, in April, which are very thrifty. In 1860 I planted nearly three acres. These were of a larger growth, say from two to four feet tall; and about one-eighth of these died.

I think the best months to transplant are April and November. If trees are planted the last of May, or the first of June, we frequently have dry weather, which, if it does not kill them, prevents their growth. When young trees can be obtained, I think that transplanting is far better than sowing the seed, and less work. Two men can set out five hundred young pines in a day, and that is enough on a half acre. If we transplant, they should be from ten to twenty inches high, when moved. In transplanting we gain five or six years in the growth, and nine out of ten will live, if properly done. The whole number of acres which I have planted is between fourteen and fifteen.

FRUIT CULTURE.

ESSEX.

Report of the Committee.

Cranberries.—For the committee on experiments in the cultivation of cranberries, I report that no cranberry grounds have been offered for their inspection. This failure is not owing to any lack of attention to such culture, but rather to the late spring frosts, which damaged alike the crops and the cultivator's hopes for premiums.

One of your committee—John D. Hildreth, of Manchester, who has taken the first premiums the last two years—has, at my request, kindly furnished me with some notes in regard to the failure of his crop this season. The facts which he presents must be interesting to cranberry growers, and I take pleasure in presenting them in this report, in place of any extended remarks of mine.

Mr. Hildreth says: "I let the water off the 10th of May. The vines soon began to grow finely—I never saw them look better. At night, on the 24th, I found the mercury was down within a few degrees of freezing. I commenced lighting my fires about nine o'clock, all around the meadow, and kept them burning through the night. The smoke went up in straight columns about forty feet, and there rested like a cloud. Perhaps if there had been less blaze, the smoke might have come down lower. The frost was as severe close beside the fire as any where. There was not one fruit bud (which had then started,) left—the ruin was complete. I afterwards put down the gate, and kept the vines nearly covered until the 13th of June. I now think the best way is to draw off part of the water before the middle of May, leaving only just enough to cover the vines, until the 10th of June. The water will get too warm in the day to freeze at night, if there is frost, and I find it will not injure the vines."

It appears from the facts here stated that burning fires afford no protection to vines, unless the state of the atmosphere be such that the smoke will settle in a cloud very low. Smoke is, perhaps, less likely to settle thus in the clearest and coldest nights than at other times; and although it may often protect vines against light frosts, it cannot *always* be relied on to perform such duty effectually. Water is a certain protection wherever it is properly applied; indeed, plenty of water under convenient control is indispensable for the most profitable culture of cranberries on our meadows. A plentiful covering of water will perfectly protect cranberry vines through all the inclemencies of winter; water will save entire crops from destruction by spring frosts; water will destroy that pest of the vine, the cranberry worm; and with water the finest crops may be grown in dry seasons, when vines on less favored grounds are pinched and parched with drought.

The cranberry crop is still worthy of the best attention. Even this season, when nearly all other fruits are superabundant—when the finest pears can scarcely be given away, and choicest apples may be had for the asking—cranberries are readily sold at from nine to twelve dollars per barrel.

Of this fruit we have not yet enough for a plentiful home supply, while we ought to export thousands of barrels yearly. This county ought to pay cranberries for all it imports from our sharp trading cousins across the Atlantic.

Nathan Page, Jr.

MIDDLESEX.

From the Reports of Committees.

Apples.—*Class No.* 1.—Leaving the more important matters pertaining to the cultivation of the apple, such as choice of varieties, selection of trees, rules for setting, pruning, &c., these having all been ably treated heretofore in the society's reports, and being generally well understood by the intelligent practical farmers of Middlesex County, perhaps I cannot better serve the interests of the society in any attempt at a report, than by offering a few suggestions relative to the preparation and arrangement of apples for exhibition.

Allow me then to suggest, in the first place, the propriety or expediency of offering separate premiums for new or seedling varieties of this most important of all our fruits; thus insuring for them a more careful examination and thorough testing. By adopting this course, and requiring full statements in relation to the fruit, character of the stock, &c., any new and really valuable variety would be soon brought to public notice.

Several new and apparently good varieties were presented for the first time this year; and while your committee noticed with pleasure these new acquisitions, they regret the action of the trustees in withholding the usual appropriation for gratuities, which deprived them of the privilege of giving more substantial evidence of their satisfaction.

In making the awards of premiums, your committee decided, and I think very properly, that those awards should be in favor of competitors presenting the best specimens of those varieties known to be most valuable for general cultivation. This rule they endeavored to carry out in their decisions, which were unanimous.

Another suggestion I would make is in regard to polishing, or rubbing. While many varieties cannot be improved by this process, as the Blue Pearmain or the Russet, others, like the Gravenstein, the Porter or Maiden Blush, may, by this simple process, be made to present a much better appearance for the table, or even for market purposes. What I would propose in this matter is, the removal of all restrictions; leaving it optional with competitors to polish or not, as they may choose. We should certainly question the good taste of the man who would present his bullock or his horse uncurried, or exhibit his swine unwashed from their naturally-loved wallow. With the same propriety, as it appears to me, we may require that vegetables be presented as taken from the ground, as that all apples be exhibited without any effort to improve their appearance.

Another simple matter to which I would call attention is, the number of specimens of a particular variety. Any person who has experienced the difficulty of placing twelve oblong or porter-shaped apples upon the round plates commonly used, will agree with me, that eleven would be a more convenient number, so far as arrangement is concerned. While it may be well to have an extra apple or two, if in eating condition, to be tested by the committee, I think the adoption of eleven instead of twelve, the number now required to be placed upon a plate, would often save the fruit from unnecessary bruises—not to mention the loss of time, and perhaps of temper, on the part of the exhibitor.

E. H. WARREN, *for Committee.*

APPLES.—*Class No.* 2.—Owing to the large number of contributors to this department, and the fine quality of nearly all the specimens, your committee found some difficulty in determining who should have the six premiums at their disposal. But we were constrained to agree upon something, perhaps for a similar reason that jurors agree when compelled to bring in a verdict on an exceedingly "knotty" case—we did not wish to stay "over night." That we did not afford a high degree of satisfaction to the unsuccessful competitors does not surprise us; for, the truth is, there were so many dishes "about neck and neck," equally deserving, it was hard to agree upon a verdict. One point we very readily agreed upon, viz.: that apples must be plenty in Middlesex County.

Another question the committee at once decided—that, inasmuch as the premiums were offered for the best specimens, and not for the largest, as some contributors imagined, we were in duty bound to consider other points and qualifications besides size. In order to make it plain to all, let a case be stated by way of illustration: A presents a single dish of Gloria Mundi apples, and another of New York Russets, all of enormous size. B brings forward one plate each of the Baldwin and Hubbardston, large, clear, and in all respects fine, though not a specimen among them is so large as the smallest of the others. For obvious reasons, we should decide to give premiums to the Baldwin and Hubbardston. Again, the Alexander is a very large and showy apple; so also is the Black Detroit—sometimes, at least; but they are scarcely worth propagating. On the table they would make a grand show, especially by the side of a dish of Hunt Russets or Mother apple, but if premiums were to be awarded, the latter would draw them, provided they were good specimens. That would be the opinion of this committee; others, of course, would act as their judgment and knowledge of the fruit should dictate.

I desire to notice, briefly, a few varieties which have not been extensively tested in this county, nor are they very generally known. Ten years ago, I procured some Northern Spy scions, and grafted a tree, the trunk of which was some nine inches in diameter. For seven years I got but little fruit therefrom ; but the eighth year from the grafting, an excellent crop of fine, late keeping apples was produced. The tenth year (1862) the tree produced another superb crop; and I trust that this variety will be permitted to enter the list of those that " promise well."

The Mother apple, on my grounds, does remarkably well, Upright in growth, it makes a fine appearing tree, particularly so when laden with dark red fruit, bending the branches to the earth, beautiful to the eye and delicious to the taste at a season when good apples are comparatively scarce, after fall apples are nearly used up, and before winter sorts are ready for use.

The "President" is very large, light colored, and flatish in form. The original tree, which was in bearing when Washington was president, and still bears regularly on alternate years, stands in its original position, in Pelham, N. H., near the North Pond, so called. The fruit is good and salable. Long may the tree remain, reminding us of past generations, when secession and rebellion were nowhere rampant in the land which produced the first president of the United States.

The "Ladies' Sweet" has been tested sufficiently to determine that the tree is remarkably prolific, though rather tender in frosty locations and heavy soil; but in situations adapted to its culture, no sweet apple is more profitable, in my judgment. The fruit is of a good color, attractive in appearance, and quite aromatic in flavor.

ASA CLEMENT, *for Committee.*

PEARS.—The cultivation of the pear is becoming of great importance in this State, especially in the vicinity of Boston, where the soil and climate are better adapted to its growth than in the interior. The premiums for ten varieties at the exhibition, were awarded, with one exception, to those grown in Cambridge ; the fruit was larger and handsomer than any grown more inland. The past season was an unusually favorable one for pears, and the crop far exceeds that of any previous year.

The dwarf tree is becoming a great favorite, where the soil is adapted to its growth; dwarfed on the quince, it will not flourish on a thin, gravelly soil, but requires one that is deep, rich, and highly cultivated. Those on their own roots will succeed on a more gravelly soil, but will do very much better when highly cultivated. For dwarf trees, ten feet apart each way is sufficient; at that distance, about four hundred and thirty trees can be set on an acre. Allowing but half a bushel of fruit to a tree, at one dollar per bushel, an acre will make two hundred and fifteen dollars, which is a very low estimate, as trees five or six years old will bear that amount of fruit, and ten years old ought to bear twice that. Two hundred dollars is a fair value for an acre of vegetables, and pears do not require any more labor in the cultivation, nor half the expense in marketing.

Quality, as well as quantity, is of very great importance for a good crop of pears; if cultivated for eating, they should be divided into two classes—good, and good for nothing; for, unless they are highly flavored, they are fit only for cooking. Three things are essential to insure a good crop. First, the soil should be very highly cultivated; second, the trees should be well thinned, and the ends of the branches should be well cut back every year; and third, the fruit well thinned; this is of the most consequence, yet it secures the least attention. While riding about the country, the past season, I have noticed that many, or in fact nearly all trees, were overloaded; some with four times as much fruit as the tree could sustain without injury; and it will be years before they will recover from this year's over-cropping; a great many trees were tied up to stakes, and otherwise supported, to prevent their breaking; I know of no better support than to keep the branches well cut back, to increase their size and strength; then pick off the fruit until the tree is able to support itself; that will secure a good crop of good fruit, handsome and well flavored. The fruit should be well thinned when it is quite small, and, unless the person is experienced, after taking off what he thinks sufficient, he can pick off half the remainder safely, and afterwards, if any imperfect ones are seen, they should be removed, allowing nothing but perfect fruit to ripen. If you have not time to pick the fruit, shake the trees—if you shake off two-thirds of it, all the better; the shaking will injure the trees somewhat, but not half so much as constant over-cropping.

It is rare to see a good, healthy, thrifty Bartlett pear tree, after it has borne a few years; the reason for this is, its tendency to over-bearing, and being allowed to mature all the fruit that nature does not cause to drop off.

The farmers yearly complain that their apples are all "dropping off." Were it not for this, one of nature's laws, our apple trees would have died some years ago from over-bearing; generally, they do not drop enough; consequently many trees have been injured by breaking; but the apple does not lose its flavor by over-bearing so much as the pear.

In conclusion, I repeat, to obtain good crops of pears, enrich the soil, head in the trees, and especially thin out the fruit.

ANDREW WELLINGTON, *for the Committee.*

Statement of John Cummings, Jr.

The fruit I offer for your premiums to-day, was grown on trees planted ten years since. The land on which they were planted had previously been used a long time for a cow pasture. When I commenced work upon it, it was mostly overgrown with bushes, and was very rough and very stony—so much so, that it seemed to me that the only way to subdue it was to trench it, and bury the stones in the low parts; and this I accordingly did, greatly improving the land thereby.

At first, I gave the land only an ordinary dressing, and planted it as soon as it was prepared with standard trees twenty feet apart, filling between, each way, with dwarfs, or pears on quince stocks. I planted in the orchard (about two acres) two hundred standard and six hundred dwarf trees.

For the first three or four years I planted the land with cherry and apple trees, for a nursery, and by so doing, very much injured the growth of my pear trees. In fact, after about the second year, they did very badly, until the nursery trees were all removed. I then used dressing more freely, and planted it less with other crops.

My experience with this orchard fully convinces me that, if Middlesex farmers would raise pears, any thing like the best specimens shown at our annual exhibition, it can only be done by a liberal dressing and clean culture. If they would have an orchard at all satisfactory, the pear crop and no other, must be our aim. I do not mean that no other crop can be raised on the orchard, but that in no case must it be at the expense of the pear crop.

Not until this year did I learn that the borer attacked the pear—the same, I think, that attacks the apple. Many of my trees have been weakened by this; and I have reason to believe that I have lost many from the same cause.

I have also found my trees injured by a small louse, that without care, will not be observed; it belongs to the same genus as the common scale louse, so often seen on apple trees, and I have found its habits to be much the same. The eggs are hatched about the middle of May, and by the last of August or first of September the female may be found in apparently a chrysalis state, covered by a thin membrane, and by a miscroscopic examination will be found filled with eggs. They will be readily found on the butts and limbs of trees. They are about one-tenth of an inch in length, and nearly the color of wood ashes. Both the insect and eggs are scarcely visible to the naked eye, but can readily be seen with the aid of a common magnifying glass. The best way to destroy them is by rubbing the trees, when they are just hatched, with a coarse cloth; they are then easily destroyed.

I have also lost some fruit by the leaf-blight, so called. This, I am quite sure, is caused by the fungus that starts on the upper side of the leaf; at first, only a small black speck that seems to take root in the leaf, under the epidermis, and spread to a considerable extent, until several of them cover almost the entire leaf, when it soon withers and drops. What produces this, or why it attacks one tree and not all, I am unable to say. I have found less of it, however, on trees that have had the best culture; and I am quite sure that keeping the ground clean and stirring it often, is the best means to prevent the pest.

I have also had my trees somewhat injured by an insect whose habits I have in some measure learned. It is found early in the spring, at work on the buds; its presence is known by a black, crusty substance, collected on the buds and the ends of the limbs. This substance is exuded matter from the insect; when first exuded, it is clear, but soon becomes black and turns hard. I think the insect found in the spring is the female; she soon commences to lay her eggs, and by the time the tree starts, has a large family to commence work; they appear to feed on the leaf of the tree, and thereby greatly injure its growth. Strong whale-oil soap-suds, applied with a stiff brush, before the leaves start in the spring, is a sure cure; it is a slow job, but, I think, the only remedy. This insect is very small, scarcely to be seen without the aid of a microscope, oval, and of a brick red color.

The varieties of pears I offer you are as follows:

The Bartlett, in praise of which I need not say any thing.

Louise Bonne de Jersey—one of the very best pears for the market, either on pear or quince.

Duchesse d' Angoulême—on a light, warm soil, and with high culture, will be found to be a very profitable variety.

Seckel—of this I need not offer an opinion.

Dunmore—a very free bearer, thrifty growing, and one of the most hardy trees I have—ripening when the market is not overstocked.

Vicar—on the quince is one of the very best pears for profit, is a most vigorous growing tree, and when on a moderately warm soil, is the most reliable of any variety.

Winter Nelis—the very best winter pear I have yet grown; it seems to take the place among pears that the Baldwin does among apples.

Beurré Diel—I have not found very satisfactory; it has been troubled with the leaf-blight much more than any other variety.

Flemish Beauty—one of the best pears of its season, but very liable so be blown off before it is quite ripe.

Woburn, September 16, 1862.

From the Report of the Committee on Plums, Melons and Peaches.

The few samples of plums and melons on exhibition, warrant the belief that there are difficulties in their successful cultivation which deter farmers from the attempt.

The only remedy for the black wart, if there is a remedy, is a free use of the knife. I have found that slacked lime, about one-half peck, thrown over the entire tree a few times, when the fruit first appears, and while the dew is on, has given me a full crop every year. One variety, the Purple Gage, never having been affected by the wart, is a hardy, thrifty tree, and a free bearer of fine fruit.

The ill success attending the raising of melons for the past ten years, and the increased facilities for bringing them from the South, have caused most cultivators to stop growing them for the market. On the new burnt lands of Maine they are grown in perfection ; and the greatest success attending their culture here has been where ashes were largely used in compost.

The glory of the peach seems to have departed—certainly from our own vicinity. That scourge of the tree, the yellows, has swept away orchards from entire counties. Beginning near Boston, it is gradually extending West, taking nearly every tree in its progress. For a year or two, peaches were grown in Weston and adjoining towns, when they had failed entirely in Brookline. So in Lincoln, Acton, Billerica, after running out in Weston ; and the disease is still marching on, baffling in its progress the most critical examination—which has failed to discern either a reason or a remedy. When a tree is attacked, it should be taken immediately from the ground. There is remaining in this vicinity part of two orchards, where the owners have strictly followed this plan, and the result is, a part of their trees remain. In walking across New Jersey a few years ago, from Amboy to Philadelphia, for the purpose of examining the peach orchards, I found, where a few years before thousands of acres were devoted alone to trees, only a few scattered, sickly looking trees left. The best orchard I saw was one where the owner had made a liberal application of salt to the soil. In my own experience, I found that wood ashes, freely used, were an excellent fertilizer. The land should not be made so rich as it should be for the pear. Excessive manuring gives too much wood at the expense of the fruit. Where whale oil soap had been freely used on the bodies and at the roots, the trees remain healthy the longest. It is absolutely necessary, in growing the peach to perfection, that the land should be kept perfectly clean, and the young fruit unsparingly thinned. On two full grown trees, one closely thinned and the other not, you get from one to three bushels on one, and one bushel on the other ; the one bushel sells in market for from three to five dollars ; the three bushels, from seventy-five cents to one dollar per bushel. To any one not familiar with the price in Boston market, this statement may seem overdrawn, but it is not. I remember having at the market, in 1856, ten bushels of early

Crawfords, which were sold for forty-three dollars; there could have been bought, at the same time, hundreds of bushels at from twenty-five cents to one dollar per bushel. One small box, of about one peck, not one peach of which measured less than ten inches, was sold to John Hill for three dollars.

I mention these facts simply to impress upon peach-growers the importance of close thinning, and a proper selection of fruit. A soil with a loamy substratum, seems best adapted to the tree. The soil of New Jersey, where the peach flourished with but little manure, so long and so well, is very nearly a clay loam, and not, as is generally supposed, a sandy soil, with the exception of the coast and the extreme southern part.

Particular care should be used in the selection of the fruit. In the Boston market, yellow, high-colored varieties, are the most salable. Now, farmers, who are better judges, prefer the white-fleshed varieties, which are decidedly better. No Crawford ever equalled the delicate flavor of the Honest John. For the market alone, the early Crawford can be strongly recommended, for at least one-half the trees set, and filled up with any well-known local varieties. The Fisk peach, originating on the farm of Mr. Jonathan Fisk, of Waltham, is a very early peach; far surpassing, in beauty and excellence of flavor, any early variety known in Eastern Massachusetts. In setting an orchard, great care should be used in procuring sound trees, free from the borer and the yellows. Strong, thrifty trees, have been delivered in Boston, in years past, from New Jersey, at six or seven cents each. They can be delivered at that price now, with a small additional cost of extra transportation, from States where trees are exempt from yellows—from part of Delaware, Virginia and Western New York.

Samuel H. Pierce, *for the Committee.*

Grapes.—The committee on grapes have attended to the duties assigned them, and the make following report:—

The whole number of entries was forty-four, mostly of native varieties. There were specimens of the Concord, Isabella, Catawba, Hartford Prolific, Delaware, Early Amber, Diana, Tokalon, Rebecca, Clinton, Muscadine, and various wildings. Of the foreign varieties there were the Black Hamburg, Victoria Hamburg, Bowood Muscat, White Nice, Syrian and Frontignac, all of them very fine; the Victoria Hamburgs, presented by Mr. Chenery, were particularly good, and were the best foreign grapes on exhibition.

The present season has, on the whole, been favorable to grapes, and they have borne a full crop, except on frosty locations, where the new shoots were killed late in the month of May; they are, however, about ten days later than usual; still, the fine weather of September has ripened the earlier varieties finely.

The Concords of Mr. T. F. Hunt, one of the exhibitors, are better than the Catawbas and Isabellas, from New York and Ohio, and have been selling in Boston for a higher price.

Of the varieties of native grapes on exhibition, the Concords took the lead, as they have done for the last few years, and I think we may safely say that it has established its reputation for being the best, hardy, native grape for general cultivation.

There were fine specimens of other varieties; among them a very good dish of Delawares, from Mr. Davis, of Acton, who exhibited quite a number of varieties.

Among the inquiries addressed to me as secretary of your society, is one from a gentleman in New Hampshire, that may not be inappropriate here. It is as follows:—

"Will you please inform me what is the best aspect and method of cultivating the grape,—vineyard culture,—in your vicinity, and what varieties are generally raised?"

This I answered nearly as follows: But few vineyards have been planted in this county; none that would be called such in Ohio, they containing only from one-half to one acre each. The only ones that have come to my knowledge are located, one in Acton, one in Dracut, and three in Concord; two of them have been planted only one year; the other three are now producing fruit.

The aspect preferred is from south-west to south-east, the nearer south the better, with a location as free from frost as possible, bearing in mind that the late spring frosts are much more destructive to the grape crop than a frost in the fall, which does not often injure the early varieties.

As to the method of cultivation—and I here refer more particularly to the Concord, the kind now planted almost entirely in this vicinity—select a good warm soil, rich enough to produce, with a moderate manuring, forty bushels of corn to the acre, and it will need but little, if any, animal manure for some years afterwards, an occasional dressing of ground bone, ashes and plaster of Paris, being sufficient; let it be ploughed twelve or fifteen inches deep, and levelled off smooth,—if there is a quantity of cobble-stones in the soil, it is none the worse for it; and the lot is now ready for planting.

And here let me say, the idea of some cultivators that to raise good native grapes it is necessary to prepare the soil, as many do their borders for foreign grapes, making them two or three feet deep, and filling them with manure, slaughter-house offal and dead animals, is not only very expensive, but useless, and, worse than that, is positively detrimental to successful cultivation. It should be the aim of the grower of grapes to produce good bearing wood for the next year, for very much depends upon that. Now, what is good bearing wood? Nothing more nor less than medium-sized, short-jointed, well-ripened wood, with large, plump buds. On the rich border just mentioned, you would be very certain to have large, long-jointed, coarse, spongy wood, with feeble buds, and, in many seasons, immaturely ripened. Such wood will not produce so much nor so good fruit as the first described. There is still another objection to the deep, rich border, and that is, the roots are encouraged to run too deep in the ground, for our climate. Here, in old Middlesex, we have no more length of season than is necessary to ripen our crop, and we cannot afford to lose one or two weeks of it; for there is that difference in the time of ripening between those planted on a very deep, rich border, and those on a soil only twelve or fifteen inches deep, the roots of the latter being better warmed by the rays of the sun. Let the rows run north and south, if possible, as it will expose the soil to the same influence.

The distance apart that the vines should be planted is a question to be settled by more experience. Mr. Hunt plants, (see p. 106, Secretary's Report,) eight feet by seven, which is fifty-six square feet to a vine, and nearly seven hundred and seventy-eight vines to an acre. They are yet only small vines, trained to a stake, like a common bean-pole, but have already produced, on an average, fifteen and one-half pounds of grapes to a vine the present year, with only ordinary cultivation, making twelve thousand and fifty-nine pounds to an acre; at twelve and one-half cents a pound, which is no more than the average price the last few years, this amounts to $1,507.37½, and at ten cents a pound, the price for which large quantities could be sold, $1,205.90; this will repay the grower.

Another inducement to some persons is, that much of the labor can be performed by females, or persons unable to do very hard work.

We hope and expect to see many new vineyards cultivated in the good old State of Massachusetts, and particularly in that part known as Middlesex County, and our county as noted for good grapes as Cambridge, in the same county, is for its very fine pears, for the introduction, cultivation and dissemination of which much credit is due to the Messrs. Hovey, of that place, who grow large quantities of a very fine quality at their nurseries—twenty thousand bushels, it is said, having been raised in that city the present year.

We think there is a good and sufficient reason why we should supply our own markets, and perhaps those of Maine, New Hampshire, and part of the British Provinces, with grapes, and that is, we can grow them at a good handsome profit.

We should also make the wine we consume, and keep our money at home, rather than send it abroad for a foreign production; then we should have the satisfaction of drinking a pure article, instead of the drugged stuff our market is now supplied with.

To those who intend to cultivate the grape as an article of profit, we would say that we think it offers a more certain return in dollars and cents than any other fruit. The statements we have made in regard to profits are not fancy estimates, but are facts that can be relied upon.

J. B. MOORE, *for Committee.*

PLYMOUTH.

Statement of Thomas O. Jackson, of Plymouth.

PEAR ORCHARD.—The pear orchard I entered for the premium of 1862, contains nearly one acre. The soil is a clayey loam, underlaid by a hard-pan, which requires tile-draining for the removal of the superfluous water. The land was cleared of rocks and bushes and ploughed in May, 1845. Manure at the rate of five cords per acre was put in the hills, and the piece was planted with potatoes. In November, twenty-four pear trees were set as deeply as they stood in the nursery, in rows fifteen by twelve feet. Trees were set yearly until 1858, when the orchard had reached its present limits of two hundred and fifty trees.

Some of the trees were set out previous to 1845, in 1842 and 1843. The cultivation has principally been a light yearly manuring, with ploughing till 1859, when the trees being too large for the team, forking was introduced, which kept the ground free and mellow. A light crop of beans and potatoes was harvested yearly till 1859, the trees then being so large planting was abandoned. The manure which was used was principally from the stable, but woollen rags, bones, fresh from the market, horn shavings, fish, ashes, guano, street-sweepings, and sea manure, have been used as auxiliaries. The trees were staked at the first setting, but staking was abandoned after the second year. They commenced fruiting the second year, and have increased the amount till the crop of the present year is estimated at two hundred bushels. The varieties suited for general cultivation, are, for early summer, Madeleine, Dearborn's Seedling, Bloodgood and Beurre Giffard ; later comes Rostiezer, St. Ghislain, Bartlett, Belle Lucrative, and Golden Beurre of Bilboa ; mid autumn, the Louise Bonne de Jersey, Buffum, Andrews, Bosc, and Seckel, seem to suit most locations ; for winter I would confine myself to the Vicar, Lawrence, and Glout Morceau. All but winter varieties are better taken from the trees before soft and ripened in the house in a dark place. Packing in woollen cloth seems to develop the colors, making the red a crimson and the pale yellow a brilliant orange. Winter varieties require a long season, and should be barrelled and ripened in a warm cellar.

GRAIN CROPS.

ESSEX.

Statement of Benjamin P. Ware.

Indian Corn.—The acre of land upon which grew the crop of corn that I offer for your consideration is a dark loam, nine inches deep, resting upon a gravelly subsoil,—rather light but not leachy land. Last year, in April, there were spread upon it four cords of compost manure; it was ploughed in, and it was then sowed with oats. June 10th the oats had attained quite a large growth; they were turned under and the land sowed with carrots, which failed to grow on account of the dry weather; late in July I sowed flat turnips, and they produced a large crop. This year—May 14th—I spread upon four-fifths of the land eight cords of manure; on the other fifth no manure was used, and it produced in proportion to the manured part, as three to five. The manure was composed of meadow mud, kelp, and barn manure, the whole drenched with night-soil. This manure was applied at different depths, the particulars of which are given in my statement of experiments with manures. The land was ploughed eight inches deep, cross-ploughed four inches deep, and harrowed; then planted, on the 17th of May, with King Philip corn, six kernels in a hill, in rows three and one-half feet apart, and the same distance between the hills. The corn was scarified or horse-hoed three times and hand-hoed twice during the season; not a weed was allowed to grow.

October 6th it was cut close to the ground and stooked up. November 3d, it being dry and in good order, I had the whole crop weighed, stored in the barn, and husked it out evenings. The cost and value of the crop I estimate as follows:—

Whole weight of crop,		15,730 lbs.
Weight of sound ears,	6,721 lbs.	
Weight of unsound ears,	184	
Weight of sound and unsound ears,		6,905 lbs.
Weight of stover,		8,825

100 pounds of ears shelled 76½ pounds; 1 bushel of shelled corn in measure weighed 57½ pounds: therefore, 6,721 pounds of ears, divided by 76½-100, equal 5,141½ pounds of shelled corn, and 5,141½, divided by 57½ pounds,—weight of 1 bushel,—equals $89\frac{4}{10}$ bushels; 184 pounds unsound corn, equal in value 1 to bushel.

Cr.

8,825 lbs. stover, at $6 per ton, ...		$26 52
$90\frac{4}{10}$ bushels corn, at 95 cents per bushel, . .		86 38
		$112 90

Dr.

To interest on land, ...	$12 00	
8 cords manure, at $5, ...	40 00	
ploughing twice, ...	4 00	
hoeing, ...	4 00	
harvesting, ...	6 00	
		66 00
Net profit, ...		$46 90

Wheat.—The land upon which the crop of wheat that I offer for premium was grown is a dark loam, nine inches deep, resting upon a gravelly subsoil, nearly level, not subject to drought or excessive wet; it measures one acre. Last year it was planted with corn, manured with six and one-half cords of good compost manure, and produced a good crop; this year no manure of any kind was used.

April 27th I ploughed finely eight inches deep; then sowed upon the furrow one and a half bushels of spring wheat, after soaking it two hours in strong brine, and harrowed it in; then dragged the ground smooth.

August 12th it was cradled and stooked up. September 3d, it being dry and in good order, I had the unthreshed grain weighed and stored in the barn; had it threshed immediately. After the grain had lain in the chaff for ten days, I winnowed and weighed it. There were 1,504 pounds. Allowing 60 pounds per bushel, it yielded $25\frac{1}{15}$ bushels of plump, handsome wheat,—a sample of which was shown at the exhibition hall, September 29th. 1,504 pounds of grain, deducted from 3,405 pounds,—the weight of unthreshed grain,—leaves 1,901 pounds of straw. As the grain was cradled very high, I cut the stubble with a mowing-machine, that it might not interfere with mowing the grass the next year, and it yielded a large half-ton of good straw for bedding; and in showing the products of the crop, it should be added to the threshed straw. The cost and value of the crop I estimate as follows:—

Dr.		
To interest on land,		$12 00
ploughing land,		2 00
harrowing and sowing,		1 50
1½ bushels of seed,		3 00
cradling and binding,		2 50
threshing and winnowing,		4 00
		$25 00
Cr.		
By 25½ bushels of wheat, at $2,	$50 13	
1½ tons of straw, at $8,	12 00	
		62 13
Net profit,		$37 13

Marblehead, November 12, 1862.

Statement of S. A. Merrill.

Wheat.—I submit the following statement of a crop of wheat that I have raised this season, upon a piece of land measuring 23,301 feet:—

Last April, about the 25th, I ploughed the land, and sowed two bushels of wheat, well washed and mixed with a peck of wood ashes; after sowing I harrowed and rolled well. The soil was a clayey loam, and had been planted two years—the last year with mangel wurzel, producing about thirty tons to the acre.

This crop of wheat I harvested in August, and threshed in October. The yield was 30⅜ bushels of wheat, and 1½ tons of straw.

COST OF CROP.

Ploughing,	$2 50
2 bushels of seed,	4 00
Sowing and harrowing,	1 00
Harvesting,	4 00
Threshing and cleaning,	4 00
Rent of land,	5 00
	$20 50

VALUE OF CROP.

30⅜ bushels of wheat, at $2,	$60 37	
1½ tons of straw, at $10,	15 00	
		$75 37
Net profit,		$54 87

Land surveyed by Thomas Cotton.

SALEM, November 6, 1862.

MIDDLESEX.

From the Report of the Committee.

The committee on grain crops have attended to the duties assigned them with alacrity and interest, believing, as they do, that every department of the exhibition is entitled to the most careful attention of those who are selected to examine and report upon its merits.

Although our county is distinguished for its mechanical and manufacturing skill, industry and wealth, it is no less so, we believe, for the intelligent management of the soil by our people, and for the valuable products which they draw from it. The farmer and gardener excels in some departments of the fine arts, as well as their fellow laborers at the bench, in the loom, or in the print shop—for the production of the splendid fruits which have crowded your tables in the fruit and floral hall to-day, are not the reward of chance or of *un*intelligent labor.

It is said that "bread is the staff of life." We suppose it means meat and fruit as well. Where these can be produced profitably and in abundance, there ought to be general prosperity and a gradul advance in all that tends to make the race happy and strong—strong at home—strong in the field, the workshop and the senate. The high culture of the soil in Middlesex, and the noble results of that culture, which have been witnessed to-day, are unmistakable signs of a high civilization among our people. They exalt, bless and sustain.

Our farming is, and we think must continue to be, of a mixed character. The farms of Middlesex are of a medium or small size, and are in the midst of a pretty dense population of artisans, manufacturers and professional persons, who live well and who demand an unusual amount of what are called the "delicacies of the season," as well as a fair share of the prime necessities of life. This fact has long invited our farmers to turn their attention to the garden, and to cause them to neglect in some degree to win the favors of Ceres in the cultivation of broad fields of grain.

It is the opinion of your committee, that every Middlesex farmer should produce, just as far as he can profitably, every article of consumption in his family—his breadstuffs, his meats, vegetables and fruits. They also believe that the climate and soil of our county is favorable to the production of the various grains, and that if the cultivation of wheat was more common among our farmers, there would be generally more cash in their pockets to meet the miscellaneous calls continually made upon them.

Upon inquiry, they are led to believe that in nearly every town in the county, that has a population of two thousand souls, between four and six thousand dollars are annually paid for the single article of flour, brought into the town from abroad. In most of the towns, this money is earned by raising and selling other products of the soil. These products are burdened with the cost of transportation in getting them to market, and then from their diminished price the consumer is obliged to pay another heavy charge in the transportation of the flour which he purchases. He forgets that the grain which grows on his own farm sells for the same price as that which comes from twenty or two hundred miles distant. But this is not all. If every farmer were a merchant, as well as farmer, understood buying and selling, and kept the run of the ever varying prices, he might stand upon something like equal ground with the "traders," whose bargains are as sharp as their wits. But this is not the case, and he loses on both sides—loses a part of the true value of his own products, and often loses by paying too much for that which he purchases, beside the cost of transportation.

As a general thing, where the cultivation is skilfully conducted, the wheat crop is as certain as the corn or rye crop, and many instances are recorded where thirty bushels to the acre have been attained. In order to accomplish this, it should be put upon rather stiff land—that is, land of granite formation. or of a clayey texture—and that was liberally manured the previous year for some other crop. The second thing of importance is, to get the seed in early, whether it be of the winter or spring variety. If winter wheat is sown as early as the last of August or first of September, it will root so deep before the ground is frozen as to resist the changes of temperature that follow, and sustain itself against the effects of heaving soil occasioned by the frost. If in late autumn the crop is found too luxuriant, it may be partly fed off by sheep or cattle, so that no danger will follow from heating and mould. In this way the crop will generally come forward the following season so early as to escape some of the insects that prey upon it, and produce results as profitable as are realized from most of the bulky farm crops. Excellent flouring mills may be found in various parts of the county, where our own wheat can be manufactured into sweet and nutritious flour that ought to satisfy the most exacting.

Some of the various kinds of barley produce abundantly, and make a most valuable feed for fattening swine, for poultry, and for the breakfast table when presented in the form of hot cakes. It is believed that this crop does not receive the attention that its merits demand. The warm, quick portions of our farms that incline to gravel, offer the very soil the plant requires, and on such almost fabulous crops have been realized. One of your committee has raised sixty bushels per acre.

The rye crop is too universal to need much comment; but your committee are inclined to express the opinion that but little profit is gained from its culture in this county. A broad extent of land has been devoted to it from time immemorial, until barrenness is its prevailing feature. If one-half of this were left to grow up to wood, and the other generously stimulated by manures, the account would show a favorable result.

Rye is a wholesome grain, and cooked in various forms, is by many considered superior to the flour of wheat.

These three grains—with the Indian corn, the glory of our New England crops—as a general thing, should be raised in amount equal to the demand of the family of every farmer. So far as breadstuffs are concerned, he would then be independent of the world.

Simon Brown, *for Committee.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of William Phelps.

Indian Corn.—The piece of corn which I have entered for a premium was raised on a portion of the rugged soil of which old Belcher hill is composed. The land had not been ploughed for some twenty years previous—having been mown during that time. A number of years ago it was planted with apple trees, set by measurement two rods apart each way. The land, though high, is rather moist and somewhat stony. The trees have this year commenced bearing for the first time. The ground was ploughed early last fall (1861) sometime about the 1st of September, about eight inches deep, and as late as possible before the ground froze, thoroughly harrowed. There was considerable grass upon the piece at the time it was ploughed, which was turned under. During the winter and spring we drew manure from the cattle-yard and hog-pen and spread upon the field at the rate of an ox-cart load (well heaped up) to each square formed by four of the apple trees, (comprising of course four rods of ground.) In the spring the land was cross-ploughed, ploughing in the manure. Just before planting, it was again well harrowed and lightly furrowed ; the rows about three feet apart, and manured in the hill, a shovelful to each hill, or from twelve to fifteen loads to the acre. The kind of corn planted was the Brown corn, eight-rowed—small cob and large kernel. It was planted about the 20th of May, the hills a little less than three feet apart in the rows. It was thoroughly hoed three times, using the cultivator between the rows, which kept it clear of weeds. After the first hoeing a small quantity of a mixture of plaster and ashes in equal parts was applied to each hill. One acre was measured from the field, and the crop carefully measured: the amount being one hundred and three and one-half bushels of fifty-six pounds. The amount of fodder was large, many of the stalks measuring over eleven feet high. In addition to the above, there were several loads of pumpkins grown on the piece. The value of the labor I have estimated as follows:—

Ploughing and harrowing,	$6 00
Drawing and spreading manure,	10 00
Planting,	2 00
Hoeing,	6 00
Harvesting,	8 00
	$32 00

BELCHERTOWN, December, 1862.

PLYMOUTH.

Statement of Spencer Leonard, Jr.

INDIAN CORN.—The acre of land on which I raised my corn is on a north-westerly slope, and is a sandy loam. It has been in grass five years without much top-dressing, and produced on an average annually about one ton of hay per acre.

It was ploughed in September, 1861, and sown to rye, and this spring, when the rye was about one and a half or two feet high, eight cords of good manure from my barn cellar were spread, and with the rye ploughed in, about seven inches deep; it was then well harrowed, and on the 21st of May it was planted in hills, three feet five inches apart each way, putting a small handful of compost, made of one part hen manure and four parts soil, in each hill. It was rather dry for the seed to vegetate for a few days after planting, but it finally came up well. Places in it were very much injured by worms, on the lower side by wire-worms, and on the high ground by the large white worm.

A cultivator was passed through it five times, and it was hoed twice. The stalks were cut about the 10th of September, but, owing to the press of other business, the corn was not harvested so soon, by about two weeks, as you directed ; consequently it was very dry when taken in. Just one acre was surveyed and staked off, and it was harvested about the 25th of October, and it weighed 5,318 pounds, or sixty-two and forty-eight eighty-fifths bushels, reckoning eighty-five pounds to the bushel ; but in the state in which it is in, I think a less amount will make a bushel. I have also raised on the acre, by estimate, four tons of pumpkins, which I do not think is good policy, if the greatest possible amount of corn is the object.

The kind of corn planted on the principal part of the acre was a twelve-rowed yellow corn, which I obtained of Charles G. Davis, Esq., of Plymouth, called by him the stone corn, I believe.

EXPENSES.

Ploughing and sowing rye in 1861, . .	$4 00
8 cords of manure, ...	32 00
Carting and spreading, ...	6 00
$\frac{1}{3}$ cord compost in the hill, . . .	2 00
Ploughing, ...	2 00
Harrowing and marking, ...	1 00
Planting, ...	2 00
Cultivating and hoeing, ...	4 50
Cutting stalks and harvesting, . . .	7 00
Interest on land, ...	4 00
	$64 50

BRIDGEWATER, October 27, 1862.

Statement of Leavitt T. Robbins.

WHEAT.—The field had been planted with corn two years previous, manured with about forty horse-loads of manure per acre, ploughed in. This spring I prepared the ground by ploughing in forty horse-loads of compost stable and hog manure per acre, mixed with dock mud, kelp and hemp-waste ; ground ploughed deep, and harrowed over several times with iron tooth harrow ; and lastly, after sowing my grass seed, harrowed over with brush harrow.

Wheat sown April 17, two bushels per acre, harvested last week in July, with sickle, threshed out September 18, 1861.

Night soil was spread on about one-half acre ; here it was quite badly lodged, which prevented it from filling well. I think the crop was injured from this cause at least five bushels ; it was also infested by the aphis, or wheat louse, while in milk. I think one and a half bushels of seed per acre enough, as it will not be so liable to lodge as when sown thicker, and it gives the grass seed a better chance to stand the drought of summer, especially when the wheat crop is taken off. I soaked my seed in strong salt water about four hours, and dried it with air-slacked lime. The lime is of great advantage in sowing, if no farther, as the seed can be distinctly seen by the sower, and enables him to sow much more uniformly.

Product, seventy-four and two-thirds bushels on two and one-tenth acres ; weight, sixty pounds to a measured bushel.

Statement of Joseph Kingman.

Wheat.—Accompanying the certificate of the measure of land on which I raised my wheat, and the amount of the grain, viz., twenty-seven and sixteen-sixtieths bushels, I send a statement of my mode of culture. The land was in grass in the spring of 1860. That season it was planted to corn, manured at the rate of fifteen loads to the acre, with barn manure ploughed under the sod. In the spring of 1861, I put on twenty loads of the same manure, ploughing and harrowing it in, and planted to early potatoes. One-half acre of this land I sowed to winter wheat, about the 25th of August, without additional manure. The seed was of two kinds, white flint and Black Sea, a half-bushel of each. The former I have raised for ten years past. Comparing the yield of the two varieties, I found that of the white flint more by one and one-half bushels, the extent and quality of the land being the same. The Black Sea, which I had from Western New York, does not, I think, endure our winters, as well as the other kind. The half acre yielded fourteen and nine-sixtieths bushels. The remainder of the land I left for spring wheat, as it was rather flat for winter sowing. I sowed near the 10th of April, putting on fifty bushels of leached and ten of unleached ashes. It came up well, grew luxuriantly, and looked finely until it blossomed, when, I should think, at least one-fifth of the heads turned black and failed of producing grain, notwithstanding which I gathered thirteen and four-sixtieths bushels of very handsome wheat at harvest time from eighty-three and one-half rods of land. It was threshed by hand, and winnowed by machine.

In preparing land for wheat, I plough six or seven inches deep, harrow, then sow the grain and harrow it in ; sow to grass seed, bush and roll ; when I sow to winter wheat, I reserve the clover seed, and sow in March. I prepare my seed by soaking it in strong salt brine, from twelve to thirty-six hours, then sift on slack lime or dry ashes, which should be well mixed with the wheat to separate the grains from each other. This preparation of the seed has proved a thorough remedy against smut, as I have tried it. I think those farmers who have the right kind of land would find it for their interest to raise wheat to supply their families with flour. A warm sandy loam, in good condition, with no hollows or basins in which water will pond, I consider well suited to wheat culture. Ice or standing water proves very fatal to winter wheat.

West Bridgewater, October 27, 1862.

Statement of James Howard.

Wheat.—The land on which I raised the crop of wheat which I entered for a premium, was ploughed in the autumn of 1860, it being in grass previously. The following spring I spread upon it about twelve cords of a mixture, made in the barn cellar, of loam, muck, and manure from stock the previous winter, and cross-ploughed it, and planted it with corn, putting a small quantity of Coe's super-phosphate in the hill.

It was ploughed and sowed with wheat the 14th of April last, using one and one-half bushels of seed. About one-third of the piece is rather low and cold ; the weeds on this part got ahead of the grain in the first part of the season, and maintained it to the end ; thereby reducing my crop of grain very much. I should think one-half of the piece produced at the rate of thirty bushels to the acre. The crop was infested by an insect, which I suppose to be a new comer. It was called by some a weevil, but which I suppose is the aphis. Whether it is or not, I do not know; a small red or brown insect, about one-twelfth of an inch in length, which fed upon the kernel while in the milk, inside of the hull where it joined to the stock; it finally had wings and left; and the grain was less perfect in consequence of its labors.

I consider wheat the most profitable grain which I can raise, and not more liable to fail than any other. With twelve years' experience, my crop has varied from fifteen to thirty-eight and one-half bushels per acre, averaging more than twenty bushels. I think the spring and winter grain equally sure, if the right kind of soil is selected. It is not necessary as is supposed by some, to have a very rich, strong soil for wheat. I have raised, this year, sixteen bushels per acre on a high, light sandy loam, pasture land, without any manure, except what was applied to the corn crop last year. It was a more profitable crop than that which I entered for a premium. I have used, with success, ashes on some soils, in the cultivation of wheat, and lime on some, slackening it in soil. I think if I had used two casks of lime on one-third of the acre—the lowest part—this year, there would have been extra wheat enough to have paid for ten casks. Crop, twenty-two and seven-eighths bushels on one acre and two and one-fifth rods. The following is an approximate cost and profit of the crop:—

Dr.

To ploughing the land,	$2 00
sowing, &c.,	1 50
seed,	3 00
harvesting the crop,	3 00
threshing,	4 00
benefit of manure,	10 00
interest on the land,	6 00
	$29 50

Cr.

By 22⅞ bushels of grain,	$40 00	
1 ton of straw,	7 00	
		47 00
Profit,		$17 50

ROOT CROPS AND VEGETABLES.

ESSEX.

From the Report of the Committee.

Onions.—The statement made by Benjamin Huntington with regard to his onion crop, containing certificates of survey and measurement, having been mislaid, the committee would report the facts laid before them. The land measured three-fourths of an acre, and has been used for onion crops for the last twenty years. Last year the crop was nearly destroyed by the maggot.

The land was fall-ploughed, and was again ploughed in the spring. It was manured with four cords of stable manure. It was seeded on the 20th of April, three pounds of seed being used on the piece, or four pounds to the acre.

The expense of ploughing, manuring, seeding, hoeing, cleaning, setting traps for the fly, and harvesting, was $94. The crop was 625 bushels, 50 pounds to the bushel. The crop sold for $343.75, leaving a net profit of $249.75.

The variety was the Danvers onion, and the size was large and uniform.

To this statement of Mr. Huntington's we subjoin that of Hanson Ordway, of West Newbury.

Statement of Mr. Ordway.

Onions.—The crop of onions I present for premium was raised on one-half an acre of land,—being a portion of the same on which was grown the crop of corn for which I received a gratuity of ten dollars the last year,—and has been cultivated as follows: Last fall two and one-half cords of barnyard manure were spread on and ploughed in five inches deep; last spring one hundred bushels leached ashes were spread on; the ground was cultivated one way with a horse-cultivator, and harrowed both ways, after which it was raked, and sown with two pounds of Danvers seed on the 7th of May. The crop received three hoeings and weedings, and when harvested was perfectly ripe and sound. The crop was sold for one cent per pound, and weighed twenty-three thousand one hundred and forty pounds, making four hundred and sixty-two bushels and forty pounds.

23,140 pounds, at one cent,		$231 40
Cost of manure and cultivation :—		
Manure,	$10 00	
Drawing and spreading the same,	2 00	
Ploughing,	1 00	
Ashes,	10 00	
Cultivating, harrowing and raking,	2 00	
Sowing,	50	
Seed,	4 00	
Hoeing and weeding,	10 00	
Harvesting,	8 00	
Marketing,	10 00	
Interest on land,	3 00	
		60 50
Profit,		$170 90

West Newbury, November 3, 1862.

The crops of both Mr. Huntington and Mr. Ordway are very large, and were cultivated with skill and care.

There is an extraordinary similarity in their statements, showing, as we think, the accuracy with which they both managed their crops. The difference in the yield and profit of each per acre is as follows :—

Mr. Huntington raises at the rate of 937½ bushels, or 46,875 pounds per acre.

Mr. Ordway raises at the rate of 925 bushels and 30 pounds, or 46,280 pounds per acre.

Mr. Huntington receives $240.75 profit on the ¾ acre, or $321 per acre.

Mr. Ordway receives $170.90 profit on the ½ acre, or $341.80 per acre.

Mr. Huntington's cultivation costs $141 per acre.

Mr. Ordway's cultivation costs $121 per acre.

It appears that Mr. Huntington's crop costs $3\frac{11}{1875}$ mills per pound.

It appears that Mr. Ordway's crop costs $2\frac{711}{1107}$ mills per pound.

It will be seen that these two crops are very nearly equal, there being a difference of only five hundred and ninety-five pounds to the acre, or about twelve bushels. It seemed to the committee that the question of economy in the cultivation was, therefore, the most prominent one to settle. And as the calculation shows that Hanson Ordway excelled in this point, they consider him entitled to the premium.

They are unanimous, also, that Mr. Huntington would be entitled to a gratuity, were any allowed, for the care and skill with which he managed his crop.

Statement of S. A. Merrill.

CABBAGES.—I submit the following statement of a cabbage crop that I raised this season. Last fall I selected an acre of old, worn-out grass-field, from which I had about one ton of hay to the acre, turned it over last fall, ploughing eight inches deep. Early in spring spread four cords of green barn manure to the acre, and cross-ploughed four inches deep; then opened my drills three feet apart, putting one barn shovelful of compost manure to each hill,—the hills being three feet apart,—and covering it about one inch deep; then dropping in my seed and covering it one-half an inch deep. The second week in May I hoed and thinned the plants to two in a hill. About this time I also scattered on each hill a small quantity of plaster, to prevent the cabbage-bug from destroying the plants when small. About the second hoeing, thinned to one plant in the hill. About the middle of August I commenced gathering them for the market, receiving for the first gatherings ten dollars per hundred, and less as the season advanced. My whole crop brought from seven to ten, and averaged eight dollars per hundred. I gathered thirty-five hundred cabbages from this acre, averaging from twenty to thirty pounds each, when ready for market,—some weighing from forty to sixty pounds, with stump and leaves on.

VALUE OF CROP.

3,500 cabbages at $8 per hundred, ...	$280 00

COST OF CROP.

Breaking up land, ...	$4 00
4 cords of green manure, ...	20 00

Cross ploughing and harrowing,	$3 00	
4 cords compost manure,	20 00	
Labor, preparing ground,	4 00	
Cost of seed,	1 00	
Plaster,	1 75	
Cultivating,	20 00	
Marketing,	50 00	
		$123 75
Profit,		$156 25

SALEM, November 6, 1862.

Statement of J. J. H. Gregory.

SQUASHES.—The piece of land I enter for premium, for squashes, was planted towards the close of May, with Boston Marrow squash, the hills being about eight by nine. After the plants had developed the sixth leaf, they were thinned to two and three plants per hill. In the course of the season the crop received three cultivatings and three hoeings. The crop was well ripened, of even size, averaging about ten pounds per squash, and showing all the outward characteristics of purity.

In the year 1858 this tract was in grass; in 1859 it was planted with the Hubbard squash, after a very heavy manuring of about eighteen cords per acre of various manures, principally barnyard. In the year 1860 the crop was cabbages, the manure, at the rate of about eight cords per acre, being barnyard, sea manure and unleached ashes. In 1861 the crop was seed cabbage, the manure being cow and hog manure, at the rate of eight cords per acre. This season the only manure applied was a handful of Coe's super-phosphate to the hill. In the early part of the season I had considerable trouble from the small striped bug; the recourse for preventing their depredations was air slacked lime applied to the leaves while moist. The large black bug, known as "stinking" bug, or "pumpkin" bug, is properly a pumpkin bug, *almost entirely disappearing after the cultivation of the pumpkin is given up in any locality.* I have found but two of them on my squash vines for the past three years.

MARBLEHEAD, November 8, 1862.

Statement of George B. Loring.

MANGEL WURZEL.—The crop of mangel wurzel which I enter for premium was raised on one acre and one-eighth of land. The soil is a heavy clayey loam, has been many years under cultivation, and is a portion of the field which was thorough drained five years ago. For three years after drainage it was devoted to grass crops, having been laid down to grass the year previous to draining. Last year it was manured on the sod, twenty-five loads, or a little more than eight cords, to the acre ; was ploughed with a Michigan plough. May 23d, harrowed, furrowed and planted to corn, with super-phosphate of lime in the hill. Early in November following it was fall-ploughed.

Early in May of this year it was manured with eight cords of barnyard manure to the acre, ploughed again, and left until May 20th. It was then ploughed again, harrowed and drilled. Seven cords of manure, a compost of barnyard manure with sand and muck, were applied in the drills.

The seed was soaked thirty-six hours in water poured hot upon it. The tops of the drills were carefully raked. An implement made of plank four inches wide and three feet long, from the bottom of which projected pins two inches long and an inch and a quarter in thickness, and seven inches apart, and on the top of which was fastened a frame handle, made by nailing narrow strips of boards, two and one-half feet long, to the ends of the plank, and fastened together at the top by a short strip a foot and a half long, was used for making holes into which the seed was to be dropped. This latter process was also done by hand, and the seed was covered by the hoe. In this way I secured an even crop, and avoided the necessity of thinning, which attends the use of a seed sowing machine. Six men (two making the holes, two dropping the seed and two covering,) sowed the piece in one day. The crop was hoed twice, and, late in the season, was once cleared of weeds by hand. The seed was imported, and was a mixture of Long Red and Yellow Globe. The crop was by measurement (sixty pounds to the bushel,) 1,800 bushels.

The account with the crop stands as follows :—

MANGEL WURZELS.

To manure, (15 cords at $5,)	$75 00
hauling manure,	8 00
ploughing twice,	4 00
harrowing,	1 00
sowing the seed,	6 00
two hoeings,	16 00
clearing,	5 00
harvesting,	20 00
	$135 00

Cr. by 1,800 bushels of roots at 9½ cents per bushel.

The cost of these roots, 9½ cents per bushel, is certainly not extravagant, considering their value as food, and the usual market price. They usually sell for seven dollars per ton, of sixty pounds to the bushel, or about thirty-four bushels to the ton; and at this rate bring twenty cents and a fraction per bushel. The market for them is not large, it is true; but they give ample remuneration for the expense and trouble of raising, in their benefit to milch cows.

According to analysis and experiment, four hundred pounds of mangel wurzel are equivalent to one hundred pounds of English hay. At sixty pounds to the bushel, the crop weighed ninety-six thousand pounds, or forty-eight tons, equivalent to twelve tons of hay, taking the estimate that four tons of mangels are equal to one ton of hay. For the production of milk, I have no doubt that the forty-eight tons of mangels are worth more than the thirteen and one-half tons of hay.

Ruta-Bagas.—I enter also a crop of ruta-bagas, raised on two and one-half acres of land, for premium.

The land was an elevated knoll, rising out of a bed of clay, and bounded on one side by salt marsh. The top of the knoll is somewhat gravelly and light; but as it inclines toward the low land surrounding it, is a warm loam.

The piece has been in grass for many years, and yielded last year a poor crop—less than half a ton of hay to the acre. It was ploughed June 20th with a Michigan plough, and manure at the rate of fifteen ox-cart loads to the acre was spread upon it and harrowed in with Geddes' harrow. It was then harrowed with a light harrow, and the loose sods turned over with the hoe. Lines were drawn with a marking rake, containing three long heavy teeth twenty inches apart, drawn by one man and held by another. In the small furrows thus made, a small quantity of Coe's super-phosphate was sprinkled. The seed was then put in with a sower. The seed used was Skirving's King of the Swedes, imported from England the last spring. The planting was finished in June.

The land was hoed twice, and the plants were thinned out, leaving spaces of six inches in the rows.

The crop was harvested by four men and two teams in four and a half days, ending at noon, November 15th. The amount of the crop is one thousand eight hundred and seventy-six bushels, at sixty pounds to the bushel, and the account is as follows:—

TWO AND ONE-HALF ACRES OF RUTA-BAGAS.

To 12 days' ploughing,	$12 00
3 " seeding,	3 00
24 " hoeing and thinning,	24 00
10 cords of barnyard manure and hauling,	50 00
1,000 pounds of super-phosphate,	20 00
27 days' harvesting,	27 00
	$136 00

Cr. by 1,876 bushels of roots, at $7\frac{5}{6}$ cents per bushel (the actual cost as per estimate.)

The market price of ruta-bagas varies materially in different seasons. Last autumn they sold for fifty cents per barrel. Last spring and this autumn they sell for one dollar per barrel. At these prices it is easy to calculate the cash value of the above crop.

As food for cattle, ruta-bagas bear the relation to English hay, which three hundred bears to one hundred. At sixty pounds to the bushel, the crop weighed one hundred and twelve thousand five hundred and sixty pounds, or fifty-six and one-third tons, equivalent to eighteen and seven-ninths tons of hay, taking the estimate that three tons of ruta-bagas are equivalent to one ton of hay.

There is no doubt that ruta-bagas are easily cultivated, on light, warm land; and I am satisfied from experience that they are the most useful root the farmer can raise for store and fattening cattle.

SALEM, November 15, 1862.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of J. E. Wight.

TURNIPS.—My turnips grew on 120 rods of ground, soil heavy loam; 76½ rods of this piece have grown turnips three years in succession. 1860, spread six loads sheep manure, and set 1,000 Scotch turnip plants. 700 lived and I had 100 bushels; the residue was sown to English turnips. 1861, applied ten loads sheep manure, ploughed under, set 4,000 Scotch turnips, and harvested 25,780 pounds, or 12 tons, 1,870 pounds —about 26 tons per acre. 1862, June 7th, spread on fourteen loads sheep manure, harrowed in, (this includes the 120 rods,) and let it rest until the last of June, when I rolled and harrowed thoroughly, made hills as for tobacco, and used phosphate in the hill; June 30th, (rainy day) transplanted from my garden 6,500 turnip plants, hills two feet apart in rows, rows about three feet apart. About forty-eight rods of the ground grew Indian corn last year, with a fair dressing of manure; yield of corn should think about forty bushels per acre; yield of turnips about the same on the two pieces. Hoed three times, harvested the first day of November; amount of turnips on one-fourth of an acre, by actual weight, 13,970 pounds; on 120 rods, 41,910 pounds, or a little over twenty-seven tons per acre.

COST OF CROP.

14 loads manure, $3 per load, (half expended,) . .	$21 00
Ploughing, harrowing and fitting land, . . .	5 00
Super-phosphate, ...	4 25
Setting plants and hoeing;	6 00
Harvesting, ...	4 50
Interest on land and taxes, ...	4 00
Total, ...	$44 75
41,910 lbs., or 20 tons, 800 lbs. at $4 per ton, . .	$83 40
For use 120 rods of land, ...	38 65

HATFIELD, November, 1862.

WORCESTER SOUTH-EAST.

Statement of James H. Putnam.

Cabbages.—I make the following statements in regard to the piece of cabbages, I have entered for premium. The piece contains seventy rods. The soil on which they were planted was of a dark loam with a yellow loam for sub-soil. Last year it was a rough, bushy pasture; it was ploughed the last of April, once, and harrowed, holed out and planted with squashes. It received about three shovelfuls of night-soil to the hill, and was not ploughed at all again till last May, the 23d day, for the first time this season. I then spread and ploughed in nine horse-loads of horse manure, night-soil and cow manure. The night-soil and horse manure were mixed together and worked over once. I ploughed again the 31st of May, and harrowed it down. It was ploughed the first time about eight inches deep, the last time nearly ten inches deep. The quality of the manure was about the average from the stables in town. I furrowed it out as nearly twenty-eight inches between the rows as I could, and put the hills, the other way, twenty-eight inches apart. I used about one-half of a common sized shovelful of compost in the hills, or six loads for the piece. The compost was made of equal parts of well pulverized night-soil and ashes, taken from heaps where I had burned sods or turf, and twenty bushels of leached ashes, and five hundred pounds of ground oyster shells, well mixed together. I then covered the compost about one inch deep, and put three or four seeds in the hill, and covered with the hand.

For seed I used the Stone Mason, excepting about four hundred hills, in which I put the Mammoth Drumhead. The quantity used was about one thousand—planted one-half, June 1st, the rest a week later. Ran a cultivator through them once; hoed three times; thinned out the plants the second and third time hoeing. I used the sweepings of the lime-room for keeping the flies off. The times of hoeing were June 28th, July 10th and 25th. Transplanted where they were missing.

Commenced harvesting September 4th. Sold in September 2,285 pounds for $28.20; sold in October 10,969 pounds for $76.90. I have included in the above weights three hundred and fifty heads, which I sold with roots on for six cents per head, and which I have estimated would weigh nine pounds per head.

The expense of the crop has been as follows:—

For ploughing twice,	$3 00
harrowing, and furrowing out,	1 90
nine horse-loads of manure,	9 00
working over manure,	50
six loads of compost, at fifty cents per load,	3 00
planting,	2 50
laying out manure,	2 50
five ounces of seed,	1 00
lime sweepings,	1 50
hoeing three times,	6 00
cultivating once,	60
transplanting,	1 00
harvesting,	4 00
seventy-fine pounds super-phosphate lime, used around the roots,	1 87
Total,	$38 37

The receipts have been as follows:—

Received in September for	2,285	pounds cabbages,	$28 20
" October for	10,969	" "	76 90
Total,	13,254	pounds	$105 10

There is left on the field one hundred heads, which will average fifteen cents per head, and four hundred heads which will average four or five cents per head.

MILFORD.

Statement of Abraham Mead.

SQUASHES.—I selected forty-six and one-half rods of the poorest portion of a sandy bluff, on Charles River, in Milford, a portion of land which I have possessed some three or four years, without having until now, realized any products from it sufficient to pay for the simple labor of gathering them. The product of last year, and of every year that I have owned it until now, was grass. The land was ploughed last fall by the society, seven inches deep. This spring, now passed, it was ploughed twice by one horse as well as he could perform his portion of the labor, and, if I am able to judge, should say the work was done indifferently well each time; sometimes the plough would go sufficiently deep to cut the sod as turned over last fall on the bottom, and at other times it would not go deep enough either to cut the sod or to give satisfaction with the ploughing. In the next place I purchased some hen manure, somewhat adulterated with straw, loam and the like—four barrels in all—four-fifths of which was put into the hills in planting time, and the remainder was diluted with water, which, together with a little plaster, was applied to the vines, to prevent the ravages of the striped bug. No manure was applied to the land last year nor any prior year within my knowledge. The hills averaged seven and one-half feet apart one way, by nine feet the other. The seeds planted were chiefly Hubbard, some Marrow, eight seeds to the hill, and the result was chiefly Hubbard, some Marrow, and perhaps some mixture. The time of planting was the 25th of May, 1861, hoeing and cultivating, 14th of June and 6th of July following, and of harvesting, 21st of September. October 5th, they were all weighed, excepting four hundred and sixty-six and one-half pounds, when the entire sum of all the squashes raised upon the forty-six and one-half rods of land aforesaid was found to be 4,981 pounds.

As would be gathered from the above, they were hoed twice only, at each of which times the ground was stirred between the hills at the same time, as it is customary, with the plough or cultivator, in the present case, once with the plough and once with the cultivator. The entire cost of raising the squashes, may be summed up as follows:—

Ploughing the land three times, ...	$3 00
Seed, ...	50
Manures, ...	5 00
Labor of carting and planting the same, ...	3 90
Cultivating and hoeing twice, ...	2 50

Applying liquid preparation for bugs,	$2 50
Harvesting,	1 25
Interest and taxes, say	1 75
Net profit,	36 91
	$57 31

PER CONTRA.

Pure Hubbard,	2,459 pounds,	
Large Blue,	541 "	
	3,000 pounds, at 1¼ cents,	$37 50
Marrow, &c.,	1,981 " " 1 cent,	19 81
	Total value,	$57 31

Milford, November 1, 1861.

MILCH COWS.

MIDDLESEX.

From the Report of the Committee.

Our own county of Middlesex, being so largely industrial and manufacturing, gives the amplest encouragement to the dairy farmer, almost every farm in it lying within reach of some busy industrial centre, whose inhabitants require a constant supply of lacteal fluid. The production of milk, then, is a matter of the highest importance to the Middlesex farmer; it is his most marketable article. The milch cow, which may be called the foster mother of us all, should be foremost among the domestic animals in the regards of our agriculturists. The nutritious fluid secreted in her mammals contains every element that is necessary for the growth and sustenance of man.

Too much attention cannot be given in this region to the breeding and management of neat cattle with reference to their milking qualities. It is wonderful how plastic the frame of the domestic animal is in the hands of the skilful breeder; he can wield it almost as he pleases, and can develop its powers and capabilities in any given direction, by constantly keeping his eye upon the end which he has in view, to an almost miraculous extent. The Ayrshire cow, now so celebrated as a dairy animal, was originally a poor, unproductive creature. By skilful breeding and good treatment, she has been developed into the overflowing milker she now is. Each cattle district wants a breed of cattle "native and to the manor born," so to speak. Every region has its peculiarities of soil, climate and physical conformation, and the animals adapted to it by birth flourish best and are most profitable. There is no reason why we should not finally have a Middlesex breed of cows equal to the world-renowned Ayrshire, Hereford, Durham and the Channel Islands. True, our pastures may not be so luxuriant, nor our atmosphere so moist as that of England and Scotland, yet human skill and care can improve nature or supply her deficiencies.

It is said that the milk product of the United States amounts to $160,000,000 ; this is a large figure.

Flint's admirable work on Milch Cows and Dairy Farming, says that the native stock or scrubs, as they are sometimes called, of eastern New England, are largely of Danish origin; others say they are deteriorated Devons. Our native cattle undoubtedly trace their origin to the herds of many lands. Not until the last quarter of a century have they received the attention, either in the way of breeding or treatment, to which their value and profitableness entitled them. Somebody has remarked, that up to 1841, the treatment of our neat cattle was such as to be a fit subject for presentment by a grand jury. They were kept out in the winter's cold "to toughen," as it was facetiously remarked ; and the grim Sabbatarian of olden times thought it a sin to look after his dumb, shivering and hunger-pinched dependents of the barnyard on Sunday. But all this has changed ; a better era has dawned for neat cattle ; blood in stock is now found to be most profitable.

The milch cow is, so to speak, a highly artificial animal ; she is, to a great extent, what her breed and keeper made her. In a state of nature, the cow gives only sufficient milk to nourish her offspring ; in the stall and barnyard of a good dairy-man she yields it all the year through, and in extreme cases, in quantities almost exceeding belief.

More attention should be bestowed upon the milch cow with us than upon stock intended for the yoke or shambles. On the rich diluvial pastures of the West beef is a prime object—with us, milk. Milch cows may be indefinitely improved by proper care and feeding, whatever their breed. Let the Middlesex farmer, like his brother farmer of the dairy shire of Ayr, breed cattle exclusively for dairy purposes, and in time, by judicious selections, he will have a native breed that will yield him all the return he can ask. It is said that an Ayrshire cow has been known to produce over ten imperial gallons of good milk per day, and one cow yielded her owner, in seven months, milk that sold for $257.

It is well known that the great utility of blood stock consists in the fact that they transmit their good qualities, without fail, while all is accidental and uncertain with native or scrub stock ; each individual stands on its own merits ; a good milker may give birth to a bad one ; even a good grade bull is not to be depended upon. To be certain of the result, resort must be had to a male of pure blood ; where both male and female are of good blood, and of a good milking breed, the offspring is sure to be excellent as a milker. It is perfectly easy for the practiced eye to tell a good dairy animal ; her external marks are unmistakable. We copy some of her characteristics from Flint's excellent work, to which allusion has already been made :—

" A good dairy cow must have a vigorous constitution and great activity of digestion and secretion ; she must be of a docile and kindly disposition ; should be roomy and deep in the ribs ; her carcass light and thin in the shoulder and fore-quarters and swelling out toward the hind-quarters ; her udder should be large and regularly formed, and covered with short, close, silky hair ; her four teats of equal size and length, and set wide apart ; and she must have large, projecting lacteal veins."

Such are some of the external marks of a good milker. No matter what her breed or qualities may be, without liberal food and good treatment she will not thrive or yield milk well. A German proverb says, " the cow milks through her mouth ;" meaning, very little milk comes out of the bag that is not put into the mouth in the shape of bountiful food. A certain quantity of food is required to keep the cow alive ; it is the excess given over this that is secreted in milk or fat. The more nutritious the food, the greater the quantity of milk secreted in the mammary glands. A few cows well kept, are more profitable than many that are obliged to ramble over old, exhausted, stinted pasture-lands.

First, secure a good milker; then house and litter her well in winter, and supply her abundantly with succulent food and pure, fresh water, feed, card and milk her regularly, and her udders will be streaming fountains of richness and wealth to her owner.

Good milk is a most important article—it is a benison to childhood; while bad milk is fatal as the sword of Herod. Its ingredients are water, butter, sugar, caseous matter, and various salts. The butyraceous matter gives it richness; the caseine, strength; the sugar, sweetness; and the water makes it an agreeable drink. Altogether, it is both a delicious food and drink, when distilled from the lacteal glands of a high-blooded, well-kept cow.

Milk drawn from the cow in the morning is thought to be of better quality than that of the evening; and a remarkable difference is perceived in the proportion of cream in the first and last portion of milking, the latter containing twice as much cream as the same quantity of the former. Dr. Hassall thinks that the average of pure milk does not exceed nine and one-half per cent. cream; that delivered in Boston will rarely yield over eight per cent. When milk is carried far by rail, or in a wagon without springs, a portion of the cream is apt to be converted into butter, and sink to the bottom of the can, from which it is not taken, in the ordinary manner of supplying customers in large cities.

In a climate like ours, subjected to months of rigorous winter weather, the stall, or shelter for the milch cow, is an important point in dairy management. It should be warm, and at the same time well ventilated. No animals are healthier than neat cattle, when well kept. The very breath of the cow is salutiferous. Cows are as sensitive to the winter's cold as their owner, and should be housed as comfortably.

It is said that where one or two Jersey cows are kept with twenty or thirty cows of other breeds, and their milk mixed, it makes a great difference in the milk and butter.

The qualities of the various foreign breeds are now so well known that they need no specification; in fact, they have all been naturalized in the various parts of our vast territory. In Ohio and the blue-grass regions of Kentucky, the magnificent Short-horns find a more congenial soil than they do in their native pastures. It seems that any breed can be transformed into good milkers by care and management.

Flint says that "the male, designed to get dairy stock, should possess a fine form, a mellow skin, large hind-quarters, and large and well-developed veins." It is also important that the teats of the bull should be set well forward and wide apart. This is a new point in the male, which has been tried in this county for the last eleven years, by various committees, under the auspices of this society, and found to be the true test. The teats should not only be wide apart, but the farther they are set forward of the scrotum, and the more fully they are developed, the more certain is the bull to produce good dairy stock.

We are glad to know that our farmers are fully awake to the importance of possessing blood stock. Our native cattle had reverted almost to a state of nature, through neglect of the principles of breeding. In blood stock, the transmission of qualities is fixed and certain. Man is unworthy of the dominion which God gave him in Eden over the lower animals, if he does not improve them. In fact, his own social advancement depends greatly upon the condition of his domestic animals; his health and physical well-being are involved in theirs; the milk, the butter, the cheese, the beef, the mutton, from animals of good stock, build up for him a sound and vigorous body—the organ of a sound mind.

Peter Lawson, *for Committee.*

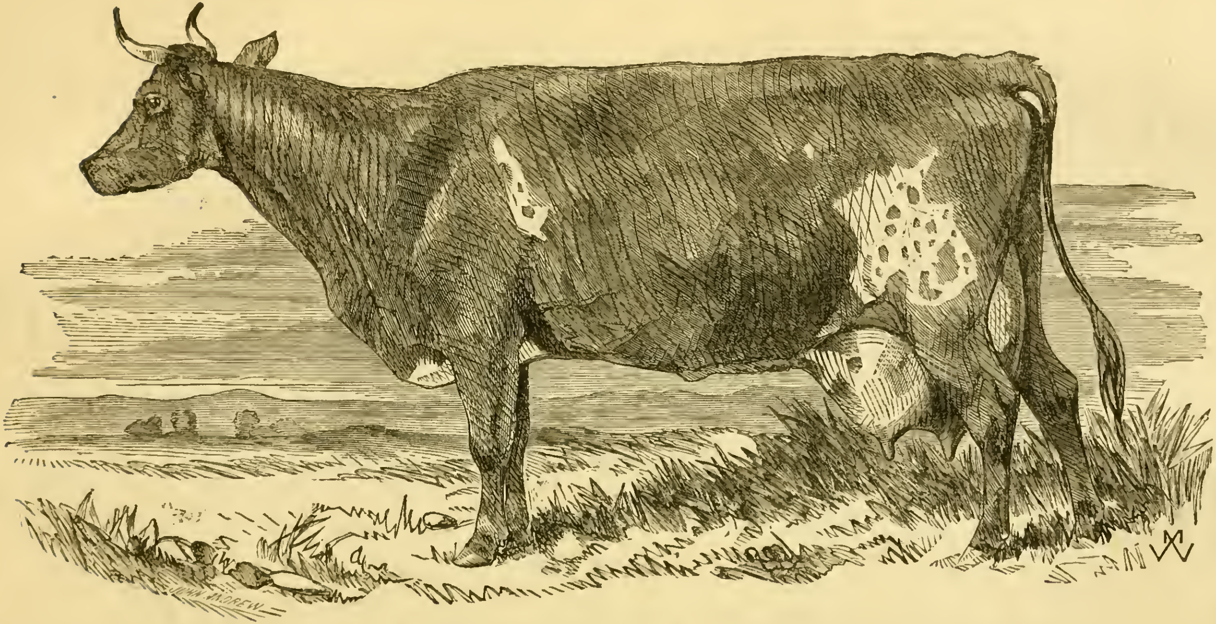
Lowell, October 19, 1862.

MIDDLESEX SOUTH.

Statement of Henry H. Peters.

The cow "*Jean Armour*," which I enter for premium, is a thoroughbred Ayrshire, six years old; was calved May 1, 1856. She was imported from Scotland by myself, in 1858. Her last calf was dropped May 20, and she is to calve again in 1863.

The weight of her milk has been carefully kept, from June 1st until the present time.


JOHN ANDREW

IMPORTED AYRSHIRE COW, "JEAN ARMOUR,"

THE PROPERTY OF H. H. PETERS, SOUTHBORO', MASS.

30	days in	June	she gave	1,524½	lbs.,	averaging	50⅚ lbs.
31	"	July	"	1,606		"	51⅚
31	"	August	"	1,441		"	46½
22	"	Sept.	"	1,041		"	47⅓

Her total product from June 1st to this date—a period of 114 days—is 5,612½ pounds, making an average of 49 pounds and 3 ounces per day. She gave during the second ten days of June, 521½ pounds of milk, being over 52 pounds per day. She gave during the second ten days of September, 462 pounds of milk, being over 46 pounds per day. Her greatest yield of milk in any one day since June 1st, was 58 pounds; the least was 43 pounds. Her milk was set for three days in July, and 6 pounds and 3 ounces of butter was made from it. The cow weighs this day—being in better order than at any time through the summer—976 pounds. She has been in good pasture all the season, has been tied in the barn always at night, and since June 12th has received daily equal to three pints of corn and cob meal, and three pints of bran, and in addition, for the past ten days, green cornstalks once a day.

Southborough, September 23, 1862.

Statement of William B. Hale.

As an act of justice to a deserving and painstaking animal, apparently bent on doing her whole duty, and making each year's history more telling than its predecessor, I desire to submit the doings of the cow owned by me the past five years, and twice honored by your society's premiums.

She dropped her calf October 26th, 1860. From November 1st to August 29th, 1862, when she again calved, a period of 22 months, she gave 15,161 pounds of the richest milk I ever saw—an average of 22 pounds 11 ounces for the entire period, including the four weeks she went dry. The yield by months was as follows:—

1860.	November, ...	1,014 lbs.,	10 oz.
	December, ...	1,068	10
1861.	January, ...	984	8
	February, ...	922	12
	March, ...	937	9

1861.	April,	855 lbs.,	3 oz.
	May,	889	11
	June,	915	
	July,	817	
	August,	701	
	September,	649	
	October,	629	
	November,	618	
	December,	574	
1862.	January,	601	
	February,	537 lbs.,	4 oz.
	March,	629	
	April,	576	
	May,	600	
	June,	494	
	July,	150	

Most of the milk was sold or used in the family, but from November, 1860, to March, 1862, 291 pounds of butter were made. Her feed in summer was pasturage alone. During the winter, hay, 2 quarts meal, and 10 pounds carrots or beets daily. Her yield for the month of September, 1862, was 1,192 pounds, an average of $39\frac{3}{4}$ pounds a day. The cost of keeping her for the 22 months was $147. The value of her product, $277.60; net profit, $120.60. Singular as it may seem, she is as beautiful in form as excellent in behavior. Such a cow is quite a handy thing in a small family.

HORSES.

MIDDLESEX.

From the Reports of Committees.

Farm Horses.—The committee were pleased to see so good a display of horses, and to see them so well driven. Of all the horses offered there were but four that were not able and willing to draw the loads. The farmers of Middlesex are fast turning their attention to the advantages of horses for all kinds of farm work. Although there are still many pairs of good oxen at the shows, we see a gradual increase in the number of horses. It is but a few years since a single horse, on almost every farm, must do all the work done by a horse, both on the farm and on the road, and a farmer's horse must be selected with reference to both kinds of work; now, on many farms, several horses are kept, and the farmers may have a pair horses suitable for all kinds of heavy farm work, and another horse to use on the road. We believe that in all cases where a farmer keeps a team the whole year, he will find it for his advantage to keep horses.

We think it is a mistaken idea that, on rough farms and for certain kinds of work, oxen are better than horses. If a farmer makes a good selection of horses, and has a proper pair for heavy work, they will do more of any kind of work, on any farm, however rough, than the best oxen. A good pair of horses will plough in grass land where one yoke of oxen cannot; and if they are well taken care of and well driven, they may be used ten hours every day, however warm it may be, and they will do one-fourth more ploughing than the best oxen. All farmers know that in the spring, when warm weather first comes, it is necessary to be very careful with oxen, especially if they have not been worked much in the winter. There are many days when they cannot be worked all day, and they must be driven slow. With a good pair of horses, it is different; they may be taken out every day, and in any field where one yoke of oxen can plough, used all day, and plough much more than the oxen. All ploughmen know that a team that moves reasonably fast will turn a sward better than a slow team. If the land is free from stones, there is little danger of the team going too fast. A man driving a horse team, with reins, has a better command of his team than he can have over an ox team; they are quicker turned and more easily brought back to the work if they start wrong. In carting, one horse will do almost as much as a yoke of oxen. If the distance is great, the horse will save much time in going and returning, and will take much more than half as large a load. The greatest advantages of oxen are, that the first cost is much less; the cost of harness is less; in case of accident, where they would have to be killed, they can be sold for beef. Still, we think that where the team is kept through the year, the advantages of the horse team are much greater than the disadvantages.

WINSLOW WELLINGTON, *for Committee.*

ROADSTERS.—Most of our farmers use the same horse for all kinds of work. They use him in the chaise and wagon, in the cart, on the plough, and under the saddle. In order to be perfect in any kind of work, the horse must be trained for that work. If he had orginally the frame and constitution suited to it, he will acquire the habit and movement best adapted to it, and will perform his work with more ease to himself and more satisfaction to his owner. The Morgan horse seems better adapted to all work than any other breed. If he were a little heavier, he would perhaps be better for farm work. But he is hardy, strong, active and docile. He has naturally those properties which fit him for the road. He has a deep chest and wide, for a horse of his size, containing ample room for the play of his lungs. His limbs are well proportioned to his body. His joints are firm and strong, and he is able to endure steady and long continued action. But even the best Morgan roadster will soon be spoiled for the road, by being subjected to heavy farm work, or by being fed in such a way as to increase his strength and muscle, rather than his activity and spirits. A good roadster must have from nature a light, easy motion, which costs him but little effort. He must have muscular power sufficient to sustain this motion, and a chest sufficiently ample to allow his distended lungs the freest play. He must have, from training, steadiness, courage, and perseverance, and such quick and ready obedience, that he and his driver shall have but one will. Then his service becomes a pleasure to both.

Among horses naturally adapted to the road we find but few good roadsters, partly from the fact already indicated, that their gait and spirits are injured by heavy work, and partly from want of suitable training. We must expect, then, to find the best roadsters among those that are kept for special service. We occasionally find a horse doing a moderate amount of farm work that remains a good roadster for years, or through life. But these are the exceptions and not the rule. The qualities to be sought in a roadster are, lightness and ease of motion, good temper, intelligence, courage and endurance. In selecting a horse for the road, we would notice the skin and hair. The skin should be thin, and the hair fine, soft, and silky; the eye should be large, full and clear, with a pleasant expression; the ear should be small, clean, sharp and movable; the eyes and ears should be set wide apart; the forehead should be broad, the muzzle small, the lips thin; the neck thin and not too long, as this denotes a stumbler, nor yet too short, or he will be hard-mouthed, and should be slightly arched; the collar bones should be oblique, and the withers thin and slightly higher than the rump; the back should be nearly straight; the chest should be deep and roomy; the barrel round; the ribs should come out nearly at right angles from the spine; the hindmost one should be very near the hip; the legs should not be too small in the bone, but flat and wide, the tendons standing well out from the bones; the joints should be full and compact; the hoofs round and firm, but not large. These marks indicate good temper, easy action, good spirits and endurance. Appropriate training and feeding must do the rest. Upon these subjects we will not undertake to enlighten our brother farmers.

An animal that can do us the service and afford us the pleasure which a good roadster can and does, is surely entitled to great care and attention. He may be easily ruined by over driving, by neglect of his feet, by injudicious feeding, and by exposure, when heated, to cold winds and storms. Hence we see so many fine roadsters with windgalls, cracked hoofs, swelled joints, breasts foundered and stiff, their courage lost and their tempers spoiled by cruelty and neglect. A man who has so hard a heart and so little manhood that he will neglect and abuse a fine horse, ought not only to suffer the pecuniary loss that necessarily follows, but also to be doomed to trudge on foot through the remaining journey of his life. Among the appalling effects of the terrible war in which our country is engaged, this is one: that the army destroys, every day, hundreds, if not thousands, of the very class of horses of which we have been speaking. This consumption must necessarily keep up the price of horses for years to come. Farmers, whose circumstances will warrant it, will draw from this fact encouragement to engage in the business of breeding horses. We have no doubt that as good horses may be raised, and are raised, in

Middlesex, as in Vermont. Whether they can be raised as profitably is another question. We are satisfied that only good horses can be profitably raised in Middlesex.

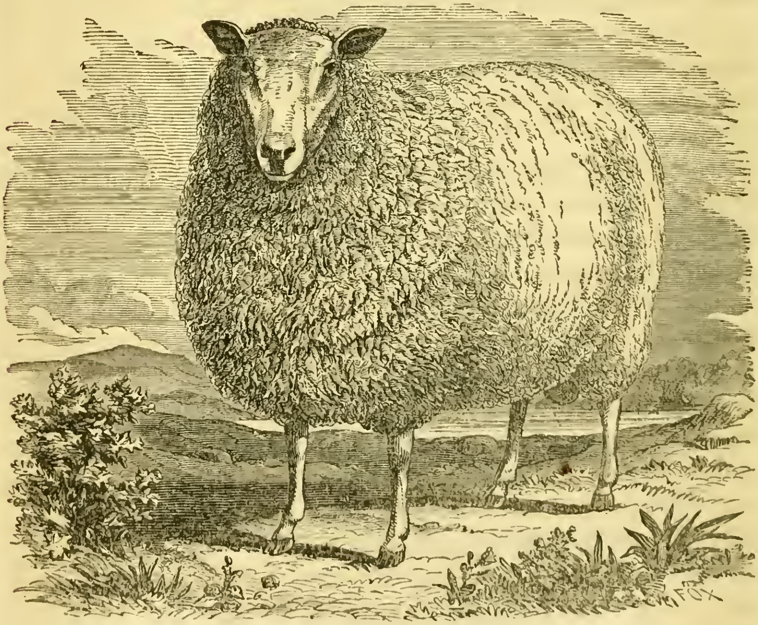
E. Wood, *for Committee.*

SHEEP.

ESSEX.

From the Report of the Committee.

The branch of agriculture, which has been referred to this committee, is one which has, within the last few months, increased very materially in importance, and has attracted unusual attention. The production of wool has become a matter of vital interest to our community. The suddenly increased demand for woollen goods, and the difficulties of various kinds which lie in the way of their importation, have



Cotswold Buck, "Dr. Kane," owned by Charles Corliss, of Haverhill.

enhanced the value of sheep of every description. And while we are still discussing the question of what kind of sheep—the smaller, fine-woolled breeds, or the heavy, coarse-woolled mutton sheep—is the most desirable, one point is clearly established, that the sheep is a most profitable animal, and that sheep husbandry is a very important part of the business of farming.

The decline of sheep husbandry in Massachusetts is remarkable, and, to some extent, unaccountable. In twenty years, from 1840 to 1860, the decrease in the number of sheep was more than 250,000, and in the latter year the whole number was but little more than 100,000 in our whole Commonwealth; and in 1850, of the 22,000,000 pounds of wool consumed here, less than 600,000 pounds was raised in the State. Meanwhile New York contained 5,118,777 sheep, and Virginia 1,293,772, and England had increased her number to over 50,000,000.

There is no reason why Massachusetts and some other parts of New England should show so little attention to the branch of agriculture which we are considering. The soil and climate are just as well adapted to it as are those of any other portion of the continent, and there is abundant evidence that the wealth of our State, and of our own county, can be materially increased by the introduction of suitable flocks upon our pastures.

In attempting to decide what flocks are suitable, we should bear in mind the circumstances of soil and climate by which we are surrounded. Our pastures are not luxuriant. Our climate is somewhat severe. Neither the grazing of summer, nor the usual quality of food in winter, is conducive to large animal growth.

One great object of English agriculture is to furnish animal food for the population of the kingdom, at as cheap a rate as possible; and to no one branch of animal breeding for this purpose has the English farmer applied himself with more skill and success than to the production of mutton. Various breeds of sheep, each adapted to the locality in which it is found, are scattered over the kingdom, supplying food, of a most nutritious and economical quality, to all classes of the inhabitants. Mutton is said to be the cheapest animal food that the farmer there can produce. The domestic consumption is very great. Every edible portion of the animal finds a ready market. The hind-quarters and saddle constitute a luxury for the rich, and the fore-quarters supply the poor with food at the most reasonable prices. In order to meet the demand which exists there, great care has been taken in the selection of animals for breeding purposes, and Mr. John Ellman, with his South Downs, and Mr. Bakewell and Mr. Cully, with their Leicesters, are looked upon as the benefactors of England ; while every farmer who cultivates his turnips and improves his pastures, for the feeding of sheep, finds that his labor meets with ample reward.

The soil and climate and agricultural system of England are admirably adapted to this business. The mild and humid atmosphere, and the equability of the temperature, encourage the growth of the animal and enable it to arrive at early maturity; at the same time the fleece has a tendency to increase in length and coarseness. The luxuriant pastures, also, afford suitable food for animals whose heavy carcasses require abundant nourishment. The ease with which root crops, especially turnips, are raised on English soil, combined with the possibility of feeding such crops on the land, during the mild winters of that island, enables the English farmer to support his sheep with great economy during the cold season. All this produces a sheep, which, when brought to the stall, is in a condition to take on fat rapidly, and to remunerate the feeder.

It is not surprising that the same system of husbandry, which developed and required short horns and horned cattle, should also develop and require Leicester, Cotswolds, Oxford Downs, Shropshires and South Downs, among sheep, of the first of which (the Leicester), Mr. Webster says: "They must be kept well; they should always be fat; and pressed, by good keeping, to early maturity, they are found very profitable." When we read of Leicesters weighing from thirty to forty pounds to the quarter, at two years old, of Cotswolds weighing nearly 400 pounds, of New Oxfordshire ewes weighing over 200 pounds, of Oxford Downs weighing 360 pounds, we should bear in mind that these animals have received English feeding, mostly on English soil, and under an English sky. It is not impossible to do this in our own State, and our own county, as the Cotswolds exhibited by Mr. Corliss, and the Oxford Downs exhibited by Mr. Fay will testify.

Oxford Downs are sent to market at fourteen months old, weighing eighty pounds, and shearing from seven to ten pounds of wool. Mr. Grennell in his Report on Sheep Husbandry, to the Massachusetts Board of Agriculture, gives the weight of Mr. Fay's Oxford Down ewes from one hundred and fifty to one hundred and eighty pounds, of a ram in the same flock, three hundred and sixty pounds, and of lambs five or six months old, one hundred pounds.

Shropshire Downs are said to dress from twenty-five to thirty pounds per quarter, and to shear from five and one-half to seven pounds of wool. It is said of them, that "for early maturity, and weight of carcass and wool, with the least amount of food, I believe they are not to be surpassed by any breed, especially if their non-liability to disease, and their fecundity, be duly taken into consideration."

Cotswolds, at two years old, are made to weigh thirty-five pounds to the quarter; and it is said that a ram of this breed has sheared seventeen pounds of "good coarse wool."

South Down wethers, at two years old, weigh from eighty-five to one hundred and twenty-five pounds, making "more internal fat than others, and on this account being favorites with the butcher." The average weight of their fleeces in England is three pounds, in this country it is said to be four pounds.

Leicesters, at two years old, weigh from twenty-five to thirty-five pounds to the quarter, having such a preponderance of external fat over internal, that while the London butchers show the inside of the Down sheep, they hang the Leicesters with the back out. The Leicesters yield about seven pounds of somewhat inferior wool.

There seems to be no data given for obtaining the comparative cost of the wool and mutton of these various breeds; and considering the differences in the cost of food, of pasturage, &c., which exist in various localities, perhaps any exact calculation is impossible. We can only say of them, that they form a part of agricultural industry, in that country where the most careful experiments have been made in the art of farming, and where the business of farming is brought within profitable rules.

There is, however, a kind of sheep husbandry practiced in less cultivated regions, which is worthy of notice. While the

English farmer is engaged in the production of those heavy breeds, to which we have referred, as best adapted to his soil, and climate, and market, his neighbors, both near and remote, are occupied with a very different business.

In the mountains of Westmoreland, Lancashire and Northumberland, and throughout Scotland, the Black-Faced Heath sheep roam over the cold, bleak pastures, whose variety and sweetness of herbage, though it is short, gives peculiar delicacy of flavor to the mutton, and whose climate gives these sheep great hardiness and endurance. They are the *short* sheep of Scotland, in contradistinction to the Cheviot, or *long* sheep,—a distinction upon which Scott and the Ettrick Shepherd had their famous discussion. In form they are short, round, firm and handsome. Their weight is from sixteen to twenty pounds per quarter, and their yield is about five pounds of long, coarse, shaggy wool.

In the more fertile and better cultivated portions of this district, the Cheviot, a larger sheep, is increasing in numbers very rapidly. These sheep are found, not only upon the high hills of Cumberland, Galloway and Westmoreland, from which they take their name, but they are very generally kept in most parts of Scotland. They are peculiarly adapted to the rough, cold region which they inhabit. Their legs are long and strong, fitting them for travelling through bogs and snow ; their quarters are strong and very evenly balanced, their fleece is close, compact and fine ; and their forms are straight, round and well proportioned. Their weight, under ordinary circumstances, is from twelve to eighteen pounds per quarter; and under extraordinary feeding and care they reach thirty and thirty-two pounds per quarter.

In Wales, a "small, short, knotty sheep" is found, kept in large flocks, and exposed to much hardship. They weigh about ten pounds per quarter, and their mutton is very highly esteemed.

In Ireland, a coarse, heavy, misshapen sheep, which attained a large size upon the rich pastures of that island, has been much improved by the introduction of blood from some of the best breeds in England.

On the continent of Europe, many varieties of sheep are found, taking their names from the countries in which they are fed. They are managed in a somewhat primitive and pastoral manner, as are the sheep of Scotland, Ireland and Wales, to which we have just referred; and, as they are chiefly kept for their wool, some knowledge of their quality and habits may be interesting to those who believe in the profits of this important article.

The most universally diffused of these breeds is the Spanish Merino. These sheep seem to have been known at a very early period, and were orignally of several varieties, whose fleeces differed in color and quality. The finest were the Andalusians, descended from the Tarentine breed of Italy, which were brought into Spain in A. D. 41, by Columella, and mixed with some valuable and beautiful African rams. From this time to the thirteenth century, wool growing and woollen manufactures increased largely in Spain; and there were at one time, in Seville alone, 10,000 looms, whose fine fabrics were exported to all parts of Europe as well as to Africa, and were a source of much national wealth. During the reign of Ferdinand V. and Philip III., nearly a million of the woollen weavers were driven from Spain, and manufactures declined; but the farmers still fed their flocks, the blood of which they preserved with great care.

The Merinos, which constitute nearly all the sheep of Spain, are divided into those which are confined to one district, and those which migrate from pasture to pasture as the seasons change.

The Spanish Merinos seem to have been used by the most eminent agriculturists of Europe for the improvement of most breeds found on the continent; although an attempt, made in 1787, to introduce them into England by George III. seems to have failed. Experiments were also made with them by Mr. Coke, Sir Joseph Banks, Lord Somerville, and others, but not with much success. Mr. Youatt observes: "In Great Britain, where the system of artificial feeding is carried to so great a degree of perfection—where the sheep is so early and so profitably brought to the market—that breed, however it may ultimately increase the value of the wool, can never be adopted which is deficient, as the Merinos undeniably are, in the principle of early maturity and general propensity to fatten." The Massachusetts farmer will bear in mind the objections here made to Merinos, viz.: That they do not make a profitable return for "artificial feeding," and do not arrive at the "early maturity" so desirable to the breeder and feeder of mutton sheep, as such. And he should also consider whether he can resort to this mode of feeding, to the neglect of his short pastures, and regardless of the amount of coarse food which he can economically and profitably feed to small and hardy sheep. He may on this point compare the profitable sheep husbandry of England with the profitable sheep husbandry of Vermont, and decide for himself which system is most worthy of his adoption.

While the introduction of Merinos among the mutton growers of England did not succeed, the experiment was made on the continent of Europe with very general satisfaction. In France, where sheep husbandry has been very much neglected, and where the native sheep have never reached a high standard, either for wool or mutton, the government made great efforts to introduce Merinos, and in 1786 laid the foundations of the famous Rambouillet flocks, from which importations have been made into this country. The Revolution seems to have checked the enterprise, however, and as late as 1831 there were 30,000,000 of the native breeds, and only 250,000 of the pure Merinos. From this cause, the extensive fine woollen manufactories of France are dependent on other nations for their supply of raw materials; and yet the only sheep in that empire which are considered truly valuable are descended from the Rambouillet flock, so admirably described by Chancellor Livingston, and from which the well known importation of Mr. Collins, of Hartford, Connecticut, was made in 1840. It is said of them that:—

"1. They possess as good constitutions, and are as thrifty and as hardy as any native or imported sheep whatever.

"2. They attain a great age, having been known to reach twenty years, and may be depended on as good breeders till twelve or fourteen years old.

"3. They have large, loose skins, full of folds, especially around the neck and below it, on the shoulders, and not unfrequently over the whole body; the wool thickly covering its surface, the forehead, cheeks, and the legs, clear down to the hoofs, giving the fleece, when shorn and spread out in its ample dimensions, the appearance of having been taken from the carcass of a huge buffalo, rather than so small an animal as the domestic sheep.

"4. The fibre of the wool is very fine, quite equal to the best Merino in Spain, and is the very antipodes of that of which so much complaint is made by the manufacturer, of being harsh, dry, crispy and wiry. The fleece opens of a brilliant creamy color within, on a skin of rich pink, and is soft, glossy, wavy, and is very even over the whole body; is exceedingly close and compact, and has a yolk free from gum, and easily liberated when it comes to be washed, but which protects the wool from the weather, and keeps it free of the dead ends that are so objectionable. It becomes of the purest white when scoured by the manufacturer, and still retains its mellow, oily touch, so grateful to the handling of good judges. Its felting properties are beyond dispute, making it a choice material for the manufacturer of fine cloths."

This description will apply to the fine-woolled sheep of Vermont and other sections of our country.

In Switzerland, the best mountain sheep are mixed Merinos.

In Saxony, Merinos have reached a great degree of perfection since their first importation in 1764. They have been preserved with great care, and have been closely bred for the purpose of improving their fleece. The sheep husbandry of Saxony somewhat resembles that of the United States. And, although the importations of Saxonies into this country have been in many instances unfortunate, they are still found to be valuable animals, in their native regions. Mr. Grennell says, that: "Although the Saxony wool is of superlative fineness, the sheep are not hardy, the fleece being so light as not sufficient to protect them from cold and wet, or to be generally remunerative, averaging through the country only two pounds and two ounces to the fleece." The account given by Mr. Carr of their in-and-in breeding, and their enervating treatment, will readily account for this.

The sheep of Prussia have been brought to an excellence rivalling the Saxonies, by the introduction of Merinos. Previous to this, they were of a very inferior character; whereas they now form a most important part of the agricultural industry of that kingdom. The same is true with regard to the sheep of Silesia, of Hungary, of Sweden, of Denmark, of many parts of Russia, and also, of Australia; in all of which places, the profits of sheep husbandry are found to arise, not from "artificial feeding," but from the pasturing of large tracts of land for the production of wool.

The introduction of Merinos into the United States, in small numbers in 1801, and more largely in 1809, '10 and '11, was the commencement of the wool-growing interest in this country. The history of this introduction is too well known to need repetition. They have been carried into almost every State, and, either pure or mixed, constitute a very large proportion of the sheep of the northern section of the Republic. Of twenty-six communications addressed to L. A. Morrell, Esq., the editor of the American Shepherd, fifteen are from breeders of Merinos, nine Saxonies, one South Down, one Lincoln; and the communications came from Vermont, Connecticut, New Hampshire, New York, Tennessee, Pennsylvania, Ohio, and Virginia.

The circumstances attending their arrival in this country were by no means fortunate. Fabulous accounts of the profits to be derived from them, excited a spirit of speculation, which ended, as it usually does, in the ruin of a large proportion of those who were carried away by it. The real value of the animal, great as it is, was lost sight of in the attempt of interested parties to give him supernatural powers for enriching every one who purchased him. But long before the generation which dealt with Merinos as if they were fancy stocks had passed away, a fixed value was established for them as farm animals, almost equal to that which had been placed upon them by the speculator.

Some of the soundest agriculturists in our country foresaw this result, even when the excitement was at its height. Hon. John Lowell, in an address before the Massachusetts Society for Promoting Agriculture, in 1818, called the attention of farmers to the subject; and, after referring to the advantages which had been derived from the introduction of Merinos into many European countries, as shown by long experience, he relates the success which attended their breeding, in one instance, in France, by M. Morel de Vinde:—

"In 1805, only thirteen years since, he began an establishment with two rams and ninety-two ewes, of the Merino breed. In eleven lambings this moderate flock produced 1,087 males, and 1,001 females; total, 2,088; of which he lost by disease 354. He sold 534, and had remaining in good health at the end of eleven years 1,200, the produce of his original stock of ninety-four. The money produce, for that period, of the flock was as follows: From the sales of wool, 33,381 pounds, which he sold for forty cents per pound, (a price only two-fifths of the average or even lowest price in Great Britain and America,) he received in cash, $13,600. From the sales of sheep he realized $10,300. And his sheep on hand valued at the rate at which the others were sold, were worth $26,000; making a total gain in eleven years, from ninety-four Merino sheep, of $49,000.

"He estimated his remaining sheep at twenty dollars per head, which, for so pure a flock, is not extravagant.

"There is no fallacy in this statement, which I have been able to detect, monstrous as the result may appear to be, that from a capital of $1,800 in sheep, a produce of $50,000 had been realized in eleven years."

Mr. Lowell expresses himself satisfied of the correctness of this statement. That it may not appear wholly extravagant, we would refer to sales recently made in Vermont, within our own knowledge. A careful and experienced breeder there has paid during this autumn one hundred dollars for a buck lamb, and twenty-five dollars per head for sixteen ewe lambs; and considers himself fortunate in having obtained them at these rates. One breeder in Vermont sells from $5,000 to $8,000 worth of sheep annually, and keeps his flock good meanwhile. Prudent and economical farmers in that State pay frequently fifty dollars per head for breeding ewes; and ewe lambs are considered worth ten dollars per head, as a fair market value. These prices are of course obtained for pure bred animals, of the most approved breeds in the State, breeds whose quality and quantity of wool have reached a high standard. Vermont, it will be remembered, is a wool-growing State. And there are abundant facts to prove that the Merino is of all sheep the most profitable producer of wool.

The amount of food which the Merino consumes is comparatively small; the amount of wool which he produces is comparatively large; and his hardy constitution and long life, he being much superior in this respect to the heavier coarse-woolled breeds, give him ample time and opportunity to repay, with large interest, any outlay which may be made upon him.

Now consider the question of food. Take any piece of pasture land and it will undoubtedly sustain three Merinos to two Leicesters or Cotswolds—more likely two to one—estimating the amount of food consumed to be in proportion to the weight of the animals, and if the pasture is light it will probably support the Merinos well, while the Leicesters can hardly live upon it. The Merinos will yield, according to the average of the best flocks in New England, fifteen pounds of wool; the coarse-woolled sheep will yield twelve pounds. Fine wool is usually worth fifty cents per pound, while coarse wool brings forty cents. We shall get, at these prices, from the land fed by Merinos, seven dollars and fifty cents' worth of wool; and from that fed by Leicesters, four dollars and eighty cents' worth; and taking the unusual prices which now rule, in which coarse wool brings sixty cents, while fine wool brings fifty, we have seven dollars and twenty cents as the produce of coarse wool, and seven dollars and fifty cents as the produce of fine wool. In one case, two dollars and twenty cents in favor of fine wool, and in the other very unusual case, thirty cents in favor of fine wool, at the present reversed prices. The calculation which we have made here is based wholly upon summer feeding; but we think the deductions drawn from it will apply still more strongly to winter feeding, in which our farmers are more deeply interested. We are satisfied that the cost of feeding a heavy mutton-sheep of almost any English breed is nearly twice as much as that of feeding a Merino, granting, of course, that the heavy sheep is to be kept in thriving condition. We have compared the Merinos with Cotswolds and Leicesters, and we might have added Oxford Downs and Shropshires, as these are really the mutton-sheep which carry fleece enough to entitle them to the name of wool-producers.

The question will at once arise—whether the amount of mutton produced by the various breeds of coarse English sheep will counterbalance their deficiency in wool, as compared with the Merinos. There is no doubt that an Oxford Down or a Cotswold will grow twice the mutton in two years, that will be grown by a Merino, perhaps more. We speak of single animals. But if the amount of food consumed by one Cotswold is as large as that consumed by two Merinos, we must estimate accordingly. Suppose a Cotswold to yield ninety pounds of mutton, and twelve pounds of wool in two years; the mutton at five cents per pound, the price usually paid by the butcher, bringing four dollars and a half; and the wool, at present prices, bringing seven dollars and twenty cents, the sheep pays eleven dollars and seventy cents. Suppose the two Merinos to yield sixty pounds of mutton and twenty pounds of wool in two years; the mutton, at the above price, brings, three dollars; and the wool, at fifty cents per pound, brings, ten dollars, the two sheep pay thirteen dollars; giving a balance in favor of the Merinos of one dollar and thirty cents. If we take the usual prices of wool, this balance must of course be greater. The advantage which the Merino possesses, is that he pays a much larger price for the food which he consumes, as he goes on to maturity. He is a more profitable boarder, an important consideration in our climate.

There is an argument in favor of coarse-woolled heavy sheep, based upon their production of lambs, which at first glance seems difficult to answer. It seems true that a lamb which at six months old will bring five dollars is more profitable than one which at the same age will bring three dollars. But is it not also true that on the same feed two fine-woolled ewes will be more likely to produce two lambs worth three dollars per head, than one coarse-woolled ewe will be to produce one lamb worth five dollars? If it is so, we get one dollar more for our feed when converted into fine-woolled lamb than we do when it is converted into coarse-woolled lamb. We must remember, moreover, that it requires an excellent pasture to raise a lamb worth five dollars, while almost any fair New England pasture will raise one worth three dollars.

In making these calculations, we have not considered the difference which exists in the quality of pasture lands in different localities. But this should by no means be lost sight of, as it should govern us, to a very considerable degree, in the selection of our animals. The early-maturing, quick-fattening, heavy English sheep need luxuriant pastures, in which but little exercise is required in the pursuit of food. Climbing high hills, and cropping short grasses, cannot conduce to large and rapid accumulations of fat, or to heavy growth. Wherever, therefore, we would feed mutton-sheep, we must be sure that we have an abundance of food so easy of access as not to interfere with that sluggishness and ease which they require for their full development.

On the other hand, if our pastures are hilly, rough, and clothed with somewhat scanty herbage, we must select those animals whose size and habits are fitted to such a condition of things. There is nothing so unremunerative, nothing so unsatisfactory, in farming, as the injudicious selection of animals for our pastures—or the attempt to feed an animal upon land to which by size, and shape, and constitution, he is unsuited. Both animal and pasture must suffer. If we would enjoy, therefore, the pleasure and profit which arise from an entire fitness of things, we should govern our choice of animals by the nature and capacity of our land. And if our pastures are not as luxuriant as western valleys and prairies, let us not repine; for what nature loses in quantity, she is very apt to make up in quality. The largest animals are by no means always the best. Rapid growth and great accumulation of external fat, either in cattle or sheep, may be gratifying to the eye, and perhaps profitable when circumstances are favorable to such development. But there is a quality of both beef and mutton, grown to a moderate size, fed on sweet mountain pastures, and lined and ingrained with well distributed fat, which is more nutritious, and may be made just as profitable. Size and quantity have great and irresistible charms; but we should not forget that *quality* is that hidden merit which outweighs all others, and really endures to the end.

The farmers of Massachusetts can easily judge—and so can the farmers of Essex County—each for himself, to which of the two classes of animals his lands are adapted. There are spots in our Commonwealth where heavy cattle and sheep find an abundance of food. But do we often see at our fairs heavy mutton-sheep, which would attract the attention of those who breed and feed such animals to perfection—sheep brought to the highest point of excellence as mutton-sheep—Cotswolds, and South Downs, and Oxford Downs, and Leicesters, looking as if they had lazily luxuriated all summer in a superabundance of food? With the exception of a few flocks, not large in number, of Cotswolds, a few of Leicesters, a few of South Downs, and a few of Oxford Downs, kept with great care and at very considerable expense, we have not seen on exhibition anywhere in New England, well developed specimens of mutton-sheep. The coarse-woolled sheep brought forward on such occasions, and exhibited as part of the farm stock of the region, often give evidence of skill in the selection, and care in the breeding of the animals; but they indicate too generally either that they have had insufficient food, or that they have been obliged to labor for their supply on rough and hilly pastures, harder than their forms and their constitutions would warrant. The condition of both fleece and carcass indicates that they have not been fed up to their requirements, at some one season of the year, either in winter or summer—perhaps in both.

So, too, on our farms, the coarse-woolled sheep rarely give evidence of good husbandry; and it would be no easy matter to select a choice flock of this description from any purely grazing section of our State. That there are good flocks here and there we do not deny; but, after careful examination, we are convinced that the average standard of mutton-sheep in New England is far below the average standard of fine-woolled. Whether this is owing to natural causes, such as soil and climate, or to the condition of our farms, or to the superior care which fine-woolled sheep receive, others can judge as well as ourselves. One thing is certain; we must take our farms as they are, in our attempts to introduce sheep upon them. That we can feed sheep profitably there is no doubt, but they must be adapted to our agricultural circumstances. We speak now of our farms generally, and not of the few rare instances in which the application of capital, liberally expended, has brought land up to the capacity of feeding any animal, however large, that may be placed upon it. This business is beyond the reach of the great mass of farmers.

In sheep husbandry, it is evident that wool is the *primary* and mutton the *secondary* object. It is wool, as the annual return which the sheep makes, that constitutes the revenue from this branch of farming. It rarely fails to furnish a liberal return to the producer. Forming, as it does, a very important article of commerce, and lying at the foundation of extensive manufactures throughout the world, it ranks with iron and coal, and cotton in the possession of an intrinsic value. It is one of the least perishable commodities produced by the farmer, and up to a certain length of time, will earn more than the interest on its value, by increase of weight in storage. It insures the property invested in sheep, after they are six months old, against loss by disease and accident; for, with the exception of a few months after shearing, the fleece of the smaller breeds constitutes more than one-half their value. Considering the safety of the investment, the economy of management, and the sure returns, it is not surprising that such extensive and profitable enterprise should be devoted to wool-producing sheep.

With mutton, however, the case is very different. It does not enter into the commerce of the world, as do beef and pork. The waste in the carcass is very great, the chief value being in the hind-quarters, which are mostly used for home consumption. It is sold in the large markets only to supply daily wants. However largely it may be used, it ranks with the luxuries rather than with the necessities of life. It is said to be produced in England twenty per cent. cheaper than beef; and in this country its market value is much less than beef, rarely commanding, except in extraordinary instances, more than from three and a half to five cents per pound to the producer. No doubt there are sections of our country, as in Maryland, Kentucky, some parts of Virginia, and the Middle and Western States, where pasturage is very luxuriant, and the climate mild, which can furnish mutton, even at these prices, with profit to themselves. There is no doubt that in the "artificial feeding" of England, mutton will yield an ample return. But we cannot believe that, as a general thing in New England, we can afford to reduce the value of the fleece for the sake of what profit we can make on the mutton.

That a combination of these two interests is possible, we have every reason to believe. There is a large quantity of mutton brought to market of very high quality and good flavor, which comes from the fine-wool regions of New England. The carcasses weigh from fifty to sixty pounds, are not loaded with a great weight of external fat, but carry much tallow, have good cauls, and furnish meat of fine grain and well marbled. The best of these sheep are Grade Merinos, usually wethers, whose wool has paid well for their keeping until they have arrived at full maturity. They compare well with the mountain sheep of Scotland—the favorite of the English epicure, who sends his own over-fattened mutton to market, for those who have a less delicate palate than himself. The class of sheep of which we are speaking are not only profitable to the producer from their heavy fleeces and the small amount of food which they consume, but they give a larger return to the feeder than any others.

John Johnston, Esq., of Seneca County, New York, one of the most careful and successful of American farmers, stated in a communication to the "Boston Cultivator," last winter, that after an experience of many years, he had found fine-woolled wethers the most profitable sheep that he could feed for the market. Thomas J. Field, Esq., of Northfield, in this State, an excellent judge of cattle and sheep, a most systematic farmer, and an extensive feeder, has informed us that this is the conclusion to which his long experience has brought him. The sheep referred to by these gentlemen are, undoubtedly, a cross between the Merino and the common native sheep of the section, composed of the various coarse-woolled breeds which have been distributed throughout the country. And we have ourselves seen in Vermont, a flock of sheep, the result of a cross between some grade Oxford Down ewes and a superior Merino buck, which for evenness of form, compactness, a proper bony structure, quality of flesh, and thrift, combined with great weight and fineness of fleece, as well as an even distribution of wool over the whole body, can hardly be excelled. The cross in this case was evidently a good one.

The same experiment has been tried with Merinos and South Downs, with marked success. Mr. Randall, in his Sheep Husbandry, gives an account of his own experience in this matter. He says: "Finding it difficult to obtain Down ewes of the proper quality, I obtained a small, compact, exceedingly beautiful, fine and even-fleeced Down ram, and crossed him with a few large-sized Merino ewes. The half blood ewes were bred to a Merino ram, and also their female progeny, and so on. The South Down form, and disposition to take on fat manifested itself, to a perceptible extent, in every generation which I bred, and the wool of many of the sheep in the third generation, ($\frac{7}{8}$ blood Merino and $\frac{1}{8}$ blood South Down) was very even, and equal to medium, and some of them to good medium Merino. Their fleeces were lighter than the full-blood Merino, but increased in weight with each succeeding cross back towards the latter. Their mutton of the first, and even of the second cross, was of beautiful flavor—and it retained some of the superiority of South Down mutton to the last."

An experiment, tried by Mr. Randall, of crossing the Merino and Leicester did not succeed so well. He produced a "showy and profitable sheep, and well calculated to please the mass of farmers." But he says: "Their fleeces lacked *evenness*—their thighs remaining disproportionately coarse and hairy; and making up my mind that this would always be a tendency of the sheep of this cross, I abandoned them without further experiment." The cross was evidently too violent.

In some parts of Massachusetts, and in the other New England States, especially Maine, New Hampshire and Vermont, Merino blood has been introduced, with the same result as followed Mr. Randall's cross with the South Downs. And while we admire the public spirit and judgment, which have induced leading agriculturists to introduce the various breeds of heavy English sheep into our State, we cannot but believe that the sheep husbandry of Massachusetts will be greatly advanced, when it is understood, that for our soil, and climate and markets, a breed of sheep whose fleece has been improved by Merino blood, and whose mutton is of the size and quality which our pastures can produce, is the most profitable for a very large proportion of our farmers.

There are many matters relating to sheep husbandry upon which the limits of this report will not allow us to dwell. The care of sheep in winter, the best modes of feeding, the time and mode of shearing, the care of lambs, treatment of disease, &c., are matters to be learned by experience, and from rules laid down in the many elaborate treatises which are within the reach of every farmer. The beneficial effects of sheep on pasture land, about which there is great difference of opinion in various parts of the State, we simply refer to as a subject of vast interest to the farmers of this county, where pastures are annually deteriorating for the want of some economical mode of cultivation. But if we shall have succeeded in attracting the attention of the members of this society to the importance of the question, and if we shall have brought forward any views which will tend to increase the interest in one of the most profitable parts of agriculture, and one in which Essex County is peculiarly interested, and to which she is well adapted, we shall feel that we have faithfully discharged the duty imposed upon us.

The chairman of the committee would state that he has been unable to consult all the members upon the opinions expressed by him in this report—and he is aware that some of them may differ from him.

George B. Loring, *Chairman.*

Statement of Charles Corliss.

I keep about thirty head, mostly Cotswolds; would like to keep a large number, but do not think it best, from the risk of loss by dogs.

The outside fence of my barnyard — part stone and part wood—is surmounted by a wire net-work fence, three and one-half feet high; here my sheep repose in safety at night, and during the winter; thus rendering them secure a large portion of the time. They are trained to come, at call, to the yard at dark every night, where they have a shed opened to the south, for shelter in wet or cold weather; a constant supply of fresh water and of salt, both *mineral* and *coarse-fine*. A door opens from the shed to a pen in the barn for winter feeding. They are not shut in the barn, except during the lambing season, but are allowed to stay out in the open air even during the coldest nights. No other stock is ever allowed in the yard with them.

They are kept quiet at all times; are tame, so as to feed from the hand, and willingly allow themselves to be handled. For a few weeks previous to, and during the breeding season, they are fed, just before night, with oats, about one pint each per day, for six or eight weeks. The change from grass to hay and *vice versa*, is gradual. During the winter they are fed regularly twice a day, viz., from seven to nine and a half, and from three to five and a half. The intervals allowed between are about right for sleeping and chewing the cud. Feeding often has a tendency to make them restless and uneasy. As large a variety of food is given as possible,—hay of different kinds, green oats cut for fodder, salt hay, a few roots on warm days, &c. They have no grain except as above; all that is given to them is to be eaten up clean. If there is any left, they are not forced to eat it, but it is taken away and less fed next time. Neat stock and horses are fond of sheep orts in small quantities. My ewes go with young 148 to 150 days. Lambs come in March and April. The ewes before lambing are provided with a warm, dry, well-bedded pen, and "all is well."

The young lambs, "each a little faithful copy of its sire," soon learn to help themselves. No change in feeding is made, except to feed often for a few days. Warm water is given the ewe for her first drink. The lambs, when about three weeks old, are provided with a crib, to which they have access through a door too small for their dams. This crib is kept supplied with oats and second crop clover, of which they soon learn to eat freely. The milk of the ewes is also now increased by feeding roots, clover, hay, &c. When the lambs are about six weeks old, their tails are docked at the joint, about one and one-half inches from the body.

My sheep are shorn in May, and sometimes again in August. They are not washed before shearing. After shearing they are washed several times during the warm weather. Their hoofs, when grown long, are pared. Fetters, bells, and other encumbrances are never used. The only thing allowed is a small split steel ring in the ear, with a copper label attached, having the number of the ewe stamped thereon. The ewes are numbered, and the number is not repeated. The bucks are named.

In regard to the weight of my ewes and of their fleeces I can make no accurate statement, having seldom troubled my self about it. Full one year fleeces weigh about eight to ten pounds unwashed, but clear and white. If the shape, qualities and disposition are right, I pay but little regard to size, unless extreme. I want none of my ewes to weigh less than one hundred nor more than one hundred and fifty pounds.

That sheep, properly managed, pay, there can be no doubt; but as to the exact profit I will not venture a statement. The improvement of the farm on which they are kept is an item of no small consideration.

Of diseases and other troubles to which sheep are liable, such as scab, foot-rot, stretches, ticks, lice, and being poisoned by eating "kill-lamb," with which my farm abounds, I have had, I think I may say, considerable experience; yet all of these difficulties I have met and conquered, so that now they cause me but little uneasiness; being fully persuaded that they can be successfully treated if taken in season.

Great care is taken in the selection and management of the bucks; for upon them the future character of the flock in a great measure depends. They are not allowed to be with the ewes at any time, except during the breeding season, but are provided with an enclosure near the house, securely fenced, containing shelter, water, shade trees, salt, feeding trough, &c. They are taught to associate with and to receive the attentions of the members of the family and others, and are always kindly treated and well cared for.

I regard sheep-husbandry as the pleasantest and sheep as the most profitable stock kept on the farm. There is no quarreling and fighting, no chasing of each other, no striving for the mastery, as among neat stock, swine, &c., no exhibition of ill-temper or viciousness; all are peaceable and friendly, manifesting a fondness and good will towards each other, not common in any other collection of equal numbers of quadrupeds or bipeds. To the person who understands their nature and disposition, there is no animal more easily managed, or that yields a readier obedience to his wishes; and I can but hope that their number may be largely increased throughout our land.

Poplar Lawn, Haverhill, November 18, 1862.

PLYMOUTH.

From the Report of the Committee.

With the exception of one small flock, all the sheep offered for premiums were worthy of exhibition, some of them quite superior; yet the number entered was not sufficient to justify the opinion that the farmers of our county give that attention to sheep husbandry which the interests of agriculture demand. Doubtless the number of sheep in the county is increasing, but at too slow a rate. All farmers admit the profitableness of this department of husbandry, but almost all seem to shrink from entering upon it. Two reasons are generally assigned for this hesitancy—the danger of loss from dogs, and the necessity of better fences. The first reason has less significance now than in former years; the last never had much force, as the farmer loses nothing by being compelled to keep his fences in good order. The true causes of the want of progress in sheep husbandry are, perhaps, the fact that our farmers have lost the habit of keeping sheep, and a failure to appreciate all the advantages of this branch of their business.

The committee are of opinion that there are but few farmers in our county who ought not to have from twenty-five to seventy-five sheep, not only on account of the profit of raising wool and mutton, but because, also, of the many indirect advantages derived from a flock of sheep on a farm. The old pastures, scant of grass, but overrun by briars, weeds and brush, which constitute the larger portion of the land under fence in the county can be renovated in no way so well as by sheep. They consume the briars and weeds, and, depositing manure just where it is needed, they cause the nutritive grasses to occupy the place of the herbage which no other animals would eat.

Where there is an insufficiency of this old pasture sheep may be turned into the woods, where they will find a good living for seven months in the year, and partly subsist even in winter. If they are induced to return home every night the owner may enclose them wherever he wishes the manure to fall, which he will find to be of very great value.

Sheep kept thus, in waste pasture or in the woods, if economically managed, ought not to cost more than one dollar and twenty-five cents per head during the winter, which is pactically the case for the whole year. In almost all cases the wool will pay this expense, leaving the lambs as profit.

That our sheep ought to be improved is very generally felt and admitted, and, if the means were easily accessible, this would doubtless be accomplished. There seems to be no doubt about the kind of blood needed to improve our stock. Public opinion points unmistakably in the direction of the leading English breeds, Leicesters, Cotswolds and South Downs, as the best sheep for our purposes. Of these, the South Downs are generally preferred. The number of pure bloods of this breed in our county is so small and the price so high, that farmers persuade themselves that they cannot do what their best judgment would dictate, in order to get a class of sheep that would be much more remunerative than those which they now keep. It is to be hoped that the English custom of letting out bucks for the season will be introduced here, which would render the improvement of stock much less expensive.

It ought to be impressed on the mind of every farmer in our county that there is no way by which he can so easily improve his farm and increase his profits, as by giving his closest attention to his sheep.

CHARLES BURTON, *Chairman.*

SWINE.

MIDDLESEX.

From the Report of the Committee.

If you take a healthy pig and put him in a clean warm place and give him as much Indian meal and grass or other green food as he will eat, there is no doubt you will have good pork. But will it pay to make pork in this way? Let us look into this subject a little. It is said that seven pounds of meal will make one pound of pork. When corn weighs fifty-six pounds a bushel, seven pounds is one-eighth of a bushel. At seventy-five cents a bushel, one-eighth is nine and three-eighth cents; so that pork at this rate would cost nine and three-eighths cents per pound.

If you buy a pig six weeks old for $2.50, which is about the common price, and at the end of a year he weighs three hundred and fifty-six pounds, you think he has done well. This is more than the average. But seven pounds of meal to each pound of pork, at seventy-five cents per bushel, would amount to $34.22; now add the $2.50 which you paid for the pig, and you have $36.72. At six cents a pound, three hundred and sixty-five pounds would amount to $21.90, or $14.82 less than cost. At five or six cents a pound, it is cheaper to buy than to make pork. You cannot afford to make pork to sell, certainly, out of Indian meal. If you can persuade yourself that the difference in quality will make up the difference in price, then you may make one pig in this way for your own use; but you cannot afford to make pork for the market. Then what is to be done? "Out West," where corn is worth twelve or fourteen cents a bushel, or about one-fourth of a cent per pound, and seven pounds costs one and three-fourths, instead of nine and three-eighths cents, they can make pork profitably even at three cents a pound. But what are we to do?

It seems to your committee that our inquiries may be brought within very narrow limits. First. Is there any breed of swine that will make a pound of pork at a less rate per pound? Second. Is there any cheaper food that, with our present breeds, will make pork at a less rate per pound? And is there any method of managing them better than we now practice? There can be no doubt, we presume, that the cross of the Suffolk breed with our old long-legged, flap-eared, large-boned breed, has produced a race of hogs that will take on fat more rapidly and at a much cheaper rate than the old breed did. This cross is the one that now seems to be in fashion. We may here remark, that fashion seems to determine the breed of hogs, as well as the form of ladies' bonnets or the material of their skirts. If the fashion plates of new breeds of hogs do not come out quite as frequently as the fashion plates of ladies' dresses, they are certainly got up with a good deal of ingenuity, and show much skill in the draftsmen. For proof of this we refer to the plates in the New England Farmer, and in the annual State Agricultural Reports.

There is no doubt that a pound of Suffolk pork can be made with less meal than a pound of any other kind of pork. This breed is disposed to pile on fat at a rapid rate. But, owing probably to this very tendency, it is difficult to raise Suffolk pigs. They are poor breeders. They do not grow as large as other breeds, and their pork when grown is too fat. These objections are so serious, that the pure Suffolks seem to have gone out of fashion. The crosses with other breeds, prove better breeders, grow larger, and have more streaks of lean mixed with the pork, which is considered an improvement by most people, especially when pork is used in preparing the favorite Sunday dinner of baked beans. The vegetarians may talk about buttered beans, or beans baked in cream, but without a good piece of pork with a lean streak in it, in the bean-pot, we fear this part of the Sunday service would soon cease, and like the pillions and foot stoves which were once so common, become obsolete.

The first two hundred pounds of a four hundred hog are made cheaper than the second two hundred pounds, and everybody says that the pork of a two hundred pound hog is the sweetest. It would seem then that it would be more profitable to kill the hogs when they had arrived at about that size. But there are two sides to this proposition, as to most others. The pork of a four hundred hog will bring a cent a pound more in the market than the pork of a two hundred hog; and then our people, farmers and Irishmen alike, have a pride in making four hundred hogs, and it is very doubtful if the practice of killing hogs when they will weigh about two hundred, will ever become popular. A cross of the Suffolk and Chester County hogs is probably as good a breed as we have at present, as they fatten easily and grow sufficiently large. So that our first question is answered.

With respect to the food and management, a good deal may be said. In the first place, we do not believe in keeping hogs to work. It is cheaper to employ a man to overhaul manure than to employ hogs. If a hog is kept at all, it should be to grow and fatten. If he works, he will eat more and grow less. We all know that a horse or ox that works hard requires much more food to keep him fat than one that is idle. If you would have a hog work, especially if he has a strain of Suffolk blood in him, you must give him but little nutritious food, and then you will have his work only for his keeping, for he will make but little fat. But we believe it is more profitable to keep a hog growing and fattening from his youth up. But, as we have already intimated, hogs, until they weigh about two hundred, may be kept cheaper than they can be afterwards. Milk, grass vegetables fed to them regularly and in proper quantities, with a little meal, will keep them in good growing condition and sufficiently fat. After that, they require more meal, or its equivalent in some other grain, until they become quite fat, when they will eat somewhat less, owing probably to the fact that they move so little and take so little exercise. The time then when we are to make the profit is while the pigs are making the first two hundred pounds. If we can get this at little cost, it will reduce the cost of the whole four hundred. If we can make the first two hundred for three cents a pound, and the second two hundred costs six cents, the whole four hundred costs four and one-half cents. At six cents a pound, or even at five, this will pay. But if the whole four hundred cost six cents a pound, it becomes a case of doubtful expediency. There are two articles of food which we would recommend, which we think have not been sufficiently used for the feeding of swine. These are apples and beets. Many people have been a good deal exercised lest there should be too many apples. But we have long since come to the conclusion, that if we have more apples than we can eat we will give them to the hogs. One of your committee, some years since, made a very successful experiment in fattening a hog on windfall and refuse apples. As apples of this description usually contain a good deal of animal matter, they seem better suited to the making of pork than of cider. A diet of two-thirds apples and one-third meal will make pork just about as fast as all meal. Hogs are very fond of beets and thrive remarkably well on them. If they are boiled and mashed up with meal, hogs will fatten on them nearly as well as on all meal. An acre of good land, well manured and well cultivated, that would yield one hundred and fifty bushels of potatoes, or four and one-half tons, will yield from fifteen to twenty tons of beets, and we think two pounds of beets are quite equal to one of potatoes, as food for hogs. If we reckon the difference in the cost of the seed for an acre of potatoes and an acre of beets, it probably costs but little more to raise an acre of beets than an acre of potatoes. With these few suggestions upon the subject of food for hogs we shall close our remarks.

JOSEPH REYNOLDS, *for Committee.*

MIDDLESEX SOUTH.

Statement of Thomas J. Damon.

The method I have taken for fattening the pigs I offer for premium, as well as all other litters, is as follows:—

I have allowed them to run with the sow until they have weaned themselves. From that time, with eleven others, they have received the milk of the dairy, with potatoes, meal and scraps. The meal is a mixture of all grains, corn, rye, barley and oats. I think that one bushel of rye is equal to one and one-half bushels of the corn in the mixture. Since the fall of apples, half the feed of all my pigs has been of sweet apples, and later in the season, mixed with pumpkins and meal, tend very much to their growth and fattening.

They are regularly fed three times a day, and by being punctual to the stated times, a great deal of the noise that we sometimes hear among swine is prevented.

Equally essential with feeding and the regularity of the same, I consider a dry and comfortable place for them. I keep them under the barn cellar, which opens on the south side, and there they have free circulation of air, and receive all necessary light for them. In summer, they are bedded with sand and dry loam, and in winter with straw, thus giving to them, at the former time, a cool and comfortable place, and in the winter a warm and dry place.

This method I have used for some time, and I have always been successful.

Three of the pigs offered at the county show last year were fattened this way, and when ten months old, weighed respectively, three hundred and fifty, three hundred and sixty, and three hundred and seventy pounds. The other one, on the 10th of April last, brought forth ten pigs, and the four offered to-day for premium are of her litter. Her weight is, I think, five hundred pounds, and she is heavy with pig at the present time, or she would have been present to-day.

Regarding the profit of fattening swine, when corn is sixty cents a bushel, a profit can be made at a sale of six cents per pound, of pork, and so on in proportion.

WAYLAND, September 23, 1862.

THE DAIRY.

PLYMOUTH.

The number of entries of butter was eleven, of cheese thirteen; in addition to which there were two small parcels of butter, for exhibition only. The butter was generally of excellent quality, the cheese universally so. We doubt whether a finer exhibition of the latter article was ever witnessed in this county. Those unsuccessful competitors, whose comments upon our errors of judgment were made in the spirit of that charity which "suffereth long and is kind," are entitled to our acknowledgments for their courtesy. Those of a different class, who could find no justification for conclusions at variance with their own, are respectfully referred to our successors, who will doubtless be men of more mature judgment and more correct tastes than your present committee, and men who will better understand on "which side their bread is buttered."

Old Plymouth cannot claim preëminence as a dairy county. Our drift formation is deficient in organic matter and in the phosphates. The herbage is scant and wiry on our lean uplands, and sedgy and sour on our undrained lowlands. One may travel for miles along our sandy roads without seeing a vigorous growth of white clover, which, more than any other grass, perhaps, indicates the presence in the soil of those elements essential to the perfection of dairy products. The farmer who does most to improve his pastures, by supplying those ingredients which are wanting and removing those which are in excess, will most effectually aid his "better half" in her attempts to excel as a dairy woman. To furnish good cows and good pastures should be his care, to make the most and best of their products, hers.

Our dairies are generally too small to insure the highest degree of excellence. The greater the quantity of cream the greater is the probability that it will be churned while fresh and sweet, and that its care will be made a principal and not a secondary matter; while the larger the cheese the less is its exposure to atmospheric influences. In these respects, at least, quantity has a direct relation to quality.

Your committee do not expect again to luxuriate upon bread and butter equal to that which we remember in our boyhood, when our appetites were sharpened by the process of adding daily to our stature; but that there are, even in these degenerate days, good dairies and successful dairy women is fully proved by the exhibition here, year after year, of butter that, well spread, would cover a multitude of the sins of bread makers, and cheese that would tempt the sluggish appetites of even the best fed men. To say that none but good articles are found here, would be untrue. Butter that feels in the mouth much like corn meal, that in which the presence of butter-milk is apparent, or that which has acquired an unpleasant flavor from its surroundings, is not creditable to the exhibition; neither is cheese that is hard or sour, or that which will crumble from its own weight. That all these defects have been noticed here in this, or previous years, is within the knowledge of some of your committee.

In judging of dairy products, the eye must be satisfied as well as the taste. No one would willingly select his butter blindfolded. White butter is usually hard—hard to the touch and hard of sale. Variegated butter is an abomination; and butter may be so extremely yellow as to be avoided, either because such butter is suggestive of the presence of foreign coloring matter, or of an excess of oily particles and a tendency to soften on the application of a very slight degree of heat. The color of butter depends primarily upon the cow, and secondarily upon the feed. The writer of this has been the owner of a cow whose butter was altogether too yellow to be desirable for table use, while her cream, mixed with that of four or five ordinary cows, would secure for the whole mass that clear straw color which is recognized by connoisseurs in the article as the perfection of color in butter. Such a cow, while almost invaluable in a large dairy, would not be desirable property for him who keeps but one.

In no other department of farm labor does success depend so much upon experimental skill and so little upon formulas as in this. Every dairy differs in some respects from all others; as in location, temperature, purity of the atmosphere, quantity and quality of milk; and in the same dairy different conditions exist at different times. The dairy woman who reads, in the published statements of previous successful competitors, of a difference of nearly one hundred per cent. in the time allowed for cream to rise, in the time occupied in churning, in the labor expended in working over, and in the quantity of salt used, will have little faith in the application of mathematics to butter making.

The first desideratum, in any attempt to systematize the operations of the dairy room, is absolute control of its temperature. While wanting this, as most dairy women do, and must, butter making, at least, will remain a matter of judgment and skill, rather than of rules and recipes. Besides, there is, and can be, no acknowledged standard of quality in butter, and of course there can be no absolute rules for its production. This is particularly true of the operation of salting. Salt, although a very desirable condiment, is not butter; nor can the quality of butter be determined by the proportion of salt which it contains. Yet this is, oftener than otherwise, made the criterion by which it is judged, and this fact has furnished the occasion for much and deserved complaint from competitors.

We recollect that, in a previous and very able report on this subject, a written statement, containing the expression "salted to suit the taste," was objected to as not being sufficiently minute. Your present committee consider that statement the essence of wisdom on this point. But whose taste is to be suited? Not that of your committees, certainly, for their peculiarities of taste cannot be known in advance. Most of our dairy women have regular customers, and theirs are the tastes to be suited or the custom fails. It is not an imaginary case that, in two parcels of butter, from the same churning, the quantity of salt is varied nearly one-half, to suit the preferences of different customers. Is one parcel better than the other; and if so, which? Both customers think the butter from their favorite dairy the best that can be bought; while, should the parcels by any accident be exchanged, both would pronounce it execrable.

It may be said, butter should be salt enough to keep. Then why not beef? Is beef, salted to the regulation standard, necessarily better than corned beef? Does he, who packs away in salt a year's supply of butter, necessarily have a better article than he who prefers to receive it fresh from the dairy each week or each month? But is salt essential to the preservation of butter? Is it not true rather, that the necessity for its use, for this purpose, indicates imperfection in the process of making? That dairy woman who cannot make butter which will keep without being made excessively salt, has, as we think, much to learn, before arriving at perfection in her art.

For the benefit of the novice, we may say that an ounce of salt to the pound of butter would be about an equi-distant mean between the two extremes of individual preferences. But a very slight experience will show that similar proportions will not always secure similar results. Salt differs in its savor, and butter in its conditions. The more imperfect has been the process of separating the buttermilk from the butter the greater will be the quantity of salt necessary to produce a given degree of saltness.

There are conditions everywhere essential to the production of good butter, and general rules that all butter makers may safely follow. Every utensil for dairy use should be thoroughly cleansed with scalding water before being used. Milk should be strained into broad, shallow pans, and should not exceed an inch and a half in depth. The pans should be placed upon slate rather than shelves, to allow free access of air, in a room used exclusively for dairy purposes, well ventilated, but as little as possible exposed to atmospheric changes, and should remain perfectly at rest till the milk is ready for skimming. Where quality is preferred to quantity, milk should be skimmed before the cream has fully risen; the time to be determined by the extent to which the preference is carried, and by the state of the weather. Cream should be churned while perfectly fresh and sweet, at a temperature of from 58° to 60°. The buttermilk should be worked out with ladles, as completely as possible before salting. Whatever quantity of salt is used "to suit the taste," it should be thoroughly incorporated with the butter. After being salted, and standing in a cool place twenty-four hours, it should be again worked over, to complete the incorporation of the salt and the expulsion of the buttermilk. If not to be used immediately, it should be carefully protected from the air, or it will soon lose that fragrance which is the crowning excellence of superior butter. By observing these suggestions as good butter will be obtained as can be made from milk of the same quality, without artificial appliances for regulating the temperature of the dairy room.

We shall not, as we might, extend this already tedious report by a dissertation on cheese making. We think that, in this county at least, milk can be made more profitable by being converted into butter, and still more so by its sale as milk, and consequently that cheese making is not good husbandry, except as a matter of convenience in the sultry dog days.

We have, however, at hand no facts bearing upon this question. We suggest whether it might not be advisable to offer a premium for the most accurate and reliable experiment to determine the profit from a given quantity of milk when made into butter, and from the same quantity when made into cheese, having reference to the labor bestowed upon each, to the comparative value of the skimmed milk and whey for feeding swine, to the cash price of the respective products, and to any other circumstances bearing upon the question under consideration.

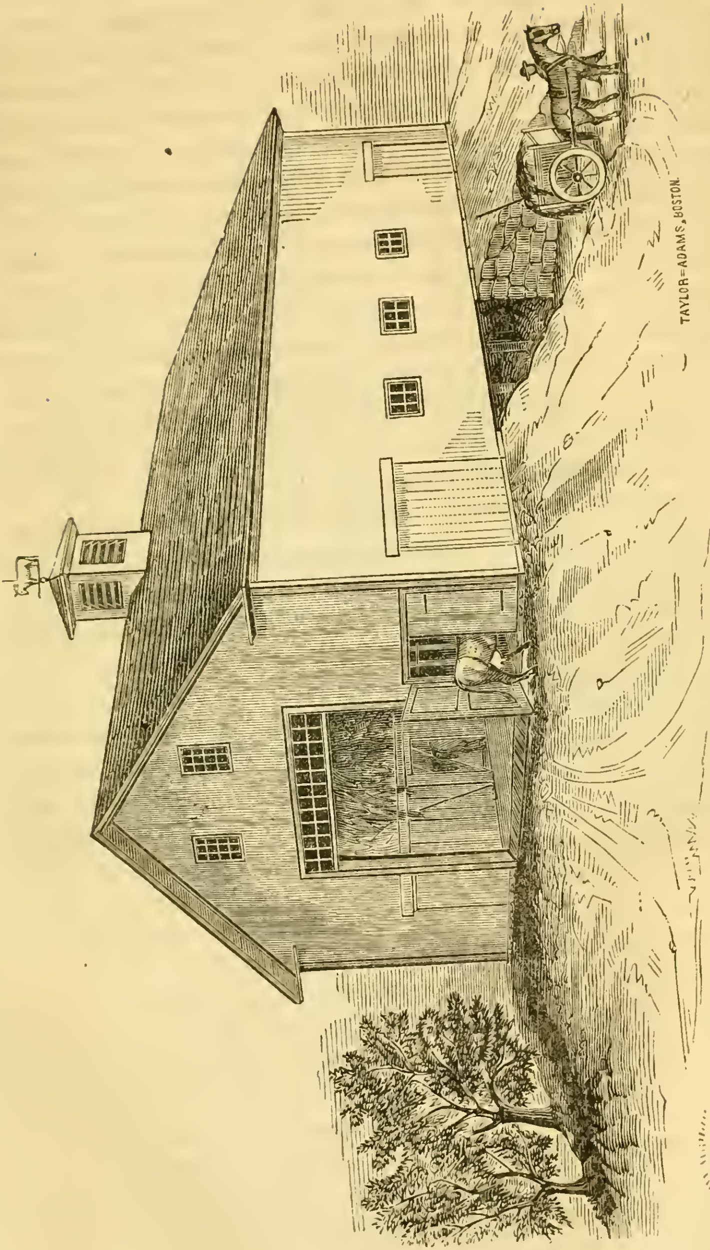
FARM BUILDINGS.

ESSEX.

Report of the Committee.

The committee appointed to erect a barn upon the Treadwell Farm, would respectfully report:—

In laying out a plan for the barn, they were governed by a desire to construct a convenient, well-proportioned, and economical building, particularly adapted to the wants and the means of a New England farmer. The size of a barn should conform to the extent of the farm, and the mode of cultivation with which it is to be connected. It should be as commodious as possible—so shaped as to furnish the most room in the space assigned it. There should be at the same time no waste of room. The storage in the barn should be easy, and so arranged as to bring the contents as near as possible to the point where they are to be used. The scaffolds and bays should be easy of access; so that the laborer shall not be compelled to lift the hay


TAYLOR=ADAMS, BOSTON.

Barn on the Treadwell Farm owned by the Essex Agricultural Society.

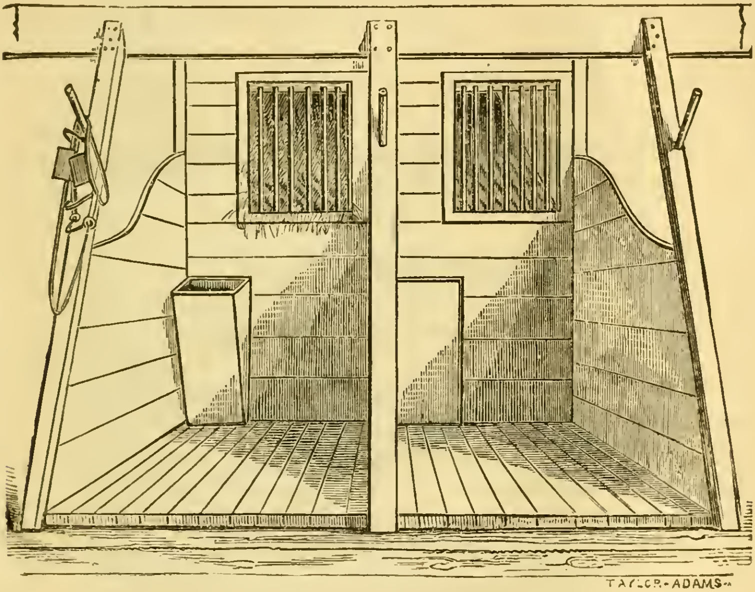
to too great a height, or to carry it a great distance. The hay should be so situated as to be easily fed to the cattle. A barn, therefore, with two drive-ways, one at each end, the passage being across the building, is inconvenient; for hay is not easily stored between these passage-ways, and the way from one end of the barn to the other is dark and narrow. A barn, too, which has a scaffold permanently fixed over the drive-way, as is often seen, is not convenient, and is wasteful of room; for it is very difficult to pitch hay through a scuttle many feet overhead, and all the room below the scaffold, and above the height of the mow-beams, is lost. A barn situated on a hillside so arranged as to have a drive-way immediately under the roof, with deep bays on each side, is not economical either of room or of money. The room below the drive-way is lost, the frame is expensive, and the different parts of the barn are inconveniently removed from each other.

It seems to the committee that a simple building, about forty feet wide, and of such length as is required, with a drive-way from one end to the other, is the most convenient design yet adopted. With this plan, the cattle may be furnished with roomy stalls, and they may stand near the hay. Room is furnished for closets, stables, &c., in convenient localities. The space over the drive-way can be occupied with a movable scaffold, if desired. The building can easily be aired; and the frame of such a building can be constructed with ease and economy. Under such a building the cellar can be properly arranged so as to accommodate the design of the room above, whether it be for cattle or horses, or for the easy storing of roots; a cellar being, in the minds of the committee, as important to a well-ordered barn as to a house.

These views governed the committee in their choice of a plan for the building. They proposed to have a cellar easy of access for teams; convenient for making manure; and provided with a root cellar, into which roots can be tipped from the cart through a trap-door in the passage-way of the barn, and the labor of carrying in baskets be thus avoided. They endeavored to divide the space in the barn into comfortable arrangements for the cattle and horses, and convenient places for the hay, straw, &c. And they endeavored, also, to erect a building which would be pleasing to the eye.

The sketch on page 243 will give an idea of the appearance of the building.

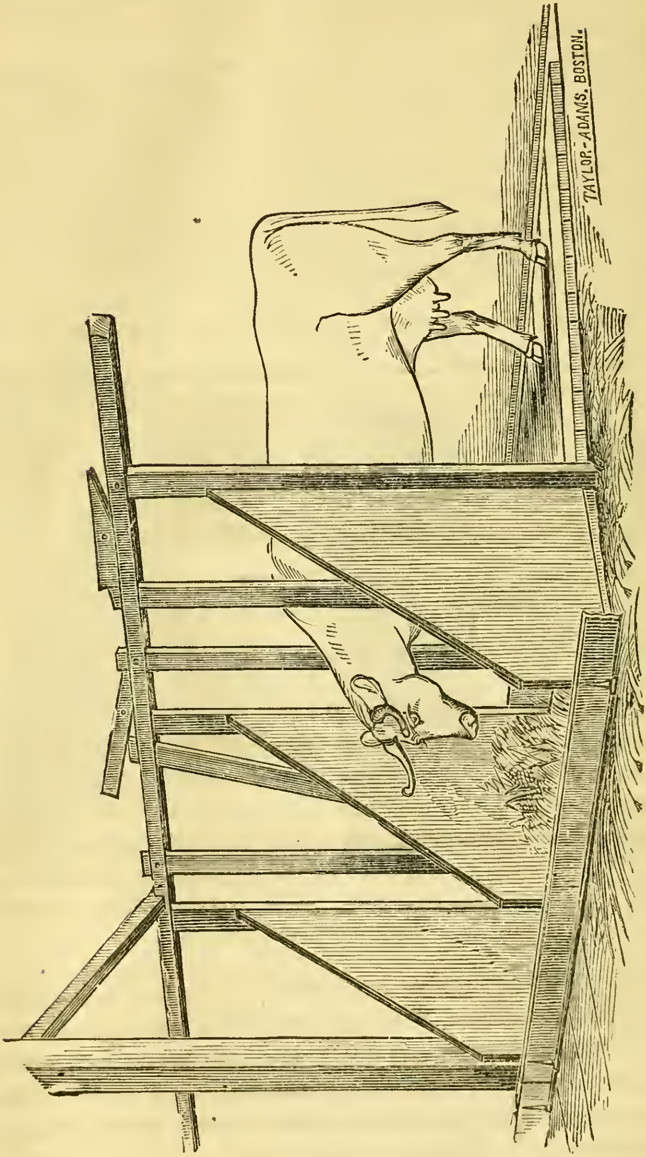
The cellar, which was built by N. W. Brown, the tenant of the farm, extends under the entire building. It has a wide opening under the front, long side of the barn, and a narrow one in the rear north-west corner, for the convenience of the fields lying in that direction. It is seven and a half feet in depth; has a substantial wall; and a small portion of it in the south-west corner is set apart for a root cellar.



Sketch of Horse Stalls.

The stalls for the horses are located in the two bands on the left of the front doors. They are provided with a passage-way in front, three and one-half feet wide, into which the movable feed-boxes, hereafter illustrated, may swing, and where grain chests can be kept. In the upper part of this passage-way are the rears of the hay racks.

The stalls themselves are provided with racks flush with the front wall, as shown in the accompanying sketch, and with movable boxes, as also shown. The floors are laid with two-inch plank, sawed in strips four inches wide, and separated three-fourths of an inch, for drainage of the water.



TAYLOR-ADAMS, BOSTON.

Sketch of Stancheons.

The cattle are tied with the common stancheon, as the safest and most convenient method. The flooring under the cattle is laid crosswise of the barn; and for the oxen it is laid open as for the horses. A manure gutter, thirteen inches wide, is provided with long trap-doors, hung on hinges. The feeding space in front of the cattle is divided by plank partitions to keep the heads of the cattle separate; the floor of the space is raised three inches from the barn floor; and in front of the spaces is a plank eight inches wide, hung at the bottom so as to fall off an inch when let down, in order to avoid clogging, and shutting in between the posts, so as to prevent the food of the cattle from being scattered over the floor. A wooden button on the posts holds each end of this plank in place. This furnishes an easy mode of cleaning the feed boxes. The annexed drawing, by Mr. Emmerton, gives a correct view of the arrangement, the most convenient the committee could devise.

The working plans of the frame, &c., have been omitted as occupying too much room.

The contract for building was made on the 6th of March, 1862, with Hon. John H. Potter, of Topsfield, under the accompanying specifications and agreement:—

SPECIFICATIONS FOR A BARN ON THE TREADWELL FARM IN TOPSFIELD, FOR THE ESSEX AGRICULTURAL SOCIETY.

Size of Barn.—Sixty feet in length by forty feet in width; with seventeen feet post.

Roof.—Ten inches over one-third pitch.

Projection.—Coving to project at eaves and ends eighteen inches, as per plan annexed.

Framing.—The timber and joists of the frame to be as per memorandum annexed, including quality and size; to be framed in five bays of twelve feet each; the floor joists in the lower floor to be framed as per plan; the studding to be framed in not more than twenty inches from centre; the small rafters to be framed in not more than twenty-two inches from centre; the frame to be pinned with white oak pins not less than one inch in size; and the scaffold girths to have two pins to each tenant, and to be joined into the posts at the lower corner three-quarters of an inch; the scaffold joists to be framed in not more than twenty inches from the centre; the scaffold enter-ties to be fastened with iron joint-bolts to the inner and outer posts; extra posts to be framed in at each end, for the sliding way of the doors, said posts to be secured at the top by suitable iron bolts and boxes made above the scaffold for the doors to slide in; the large rafters to be fastened with foot-bolts of suitable size, with nuts to the same.

Covering.—The whole exterior of the building to be covered with good merchantable hemlock boards, well nailed with tenpenny Tremont nails.

The roof to be covered with second quality of shaved cedar shingles, to be laid not more than four and one-half inches to the weather, and nailed with Swedes iron nails. The sides to be covered with the first quality of spruce clap-boards, jointed and well butted, and nailed with six-penny Tremont nails. The coving, gutter and trimmings to be wrought as per plan, from good No. 3 Eastern pine stock.

Cupola.—Not less than five feet square, to be framed into the roof, with ventilating doors and blinds, and pulleys and fastenings to the same; the height, projection and trimmings as per plan annexed.

Doors and Windows.—The end doors to be of size of opening, as per plan; to be framed of two inch pine plank, and covered with narrow, clear pine boarding, matched and beaded—made in one or two parts, as the committee may direct—and hung at the top with rollers not less than eight inches in diameter. Also a door at each end opening into the tie-up of the cattle, eight feet in width, to be divided in the centre, framed and covered in the same manner as the large doors, and hung with outside hinges, and to be furnished with suitable bolts and fastenings. Five other doors to be furnished, to be located according to the directions of the committee, and suitable bolts and fastenings to the same.

Eight windows, of nine by twelve glass, to be located as directed by the committee; also, top-lights over the great doors, two lights of nine by twelve glass in width, extending the width of the door-way; also, a window in each gable end, of nine by twelve glass, twelve lights.

Flooring and Scaffolding.—The floor to be laid with hemlock boards and two inch pine plank—that for the drive-way to be of a uniform width of twelve inches. The scaffold floors to be laid with two thicknesses of hemlock boards; all the boarding of the floors to be nailed with ten-penny Tremont nails, and the planking with forty-penny Tremont nails; in all cases pains to be taken in laying the floors to break joints, and to lay the boards and planks as closely as possible.

Inside Finish.—Three stalls for horses, to be built of mill-planed spruce, with crib and hay-rack according to the direction of the committee, with a suitable partition between the stalls and the barn floor-way, and a sliding door to separate them therefrom; the floor of the stalls to be laid of two-inch pine plank, according to the direction of the committee; stairs to be constructed leading to the scaffold.

Tie-up for Cattle.—To be constructed the length of one side of the barn, with floors, and ties, and trap-doors, according to the direction of the committee.

Meal Room and Calf Pen.—To be constructed according to the direction of the committee.

Painting.—All the clap-boards to be painted one coat of lead and linseed oil; the trimmings and doors to be painted two coats of first quality lead paint and linseed oil; color, &c., according to the direction of the committee.

CONTRACT.

An agreement, of two parts, made this 6th day of March, in the year one thousand eight hundred and sixty-two, between George B. Loring, Charles P. Preston and Royal A. Merriam, a committee appointed by the Essex Agricultural Society, for the purpose of building a barn on the Treadwell Farm, in Topsfield, on the one part, and John H. Potter, of Topsfield, on the other part, as follows, viz.:—

That I, the said Potter, shall, at my own cost and charges, provide all and every kind of materials, and of the best quality; also, perform all and every kind of labor required, together with the tools, carting, implements, &c., necessary for a complete finish of a building for the said committee, on the Treadwell Farm, in Topsfield, agreeably to plans and specifications annexed.

The work to be commenced immediately, and to be forwarded with all reasonable dispatch, so that it may be completed on or before the 30th day of June, 1862, and so delivered up to the entire satisfaction of said committee.

In case of any delay on the part of said Potter, in providing suitable materials, or in forwarding the works with such dispatch as is thought proper by the said committee, it shall be lawful for the said committee, after giving three days' notice, in writing, to the said Potter, without effect, to furnish materials and employ workmen to complete the works within the time agreed upon; the amount or amounts of bill or bills incurred thereby for materials and labor to be deducted from the contract amount, or any moneys which may be due to the said Potter.

The said Potter does for his heirs, administrators and assigns, hereby promise and agree, to and with the said committee, to well and truly perform all the works of every kind mentioned and contained in the foregoing particulars, and according to the plans prepared and referred to, and subject to the conditions above recited, at and for the sum of eleven hundred and twenty-five dollars.

In consideration that the said Potter shall well and truly perform the whole of the foregoing, agreeably and in every respect with the conditions above recited, the said committee agree to pay, or cause to be paid, to the said Potter, the sum of money before mentioned, and in separate payments, as follows, viz.:—

When the frame of the barn is raised, three hundred dollars.

When the barn is boarded, shingled, and the roof made tight, and the sides clap-boarded, three hundred dollars.

When the cupola is finished, the trimmings finished, and the inside finished, three hundred dollars.

And the balance of two hundred and twenty-five dollars within thirty days of the time when the whole job is completed, and so delivered up to the entire satisfaction of the said committee.

In witness whereof the parties have hereunto set their hands, on the day and year above written.

George B. Loring,
Charles P. Preston,
R. A. Merriam,
Committee.

Witness, Arthur M. Merriam.

John H. Potter.

The work was done in a thoroughly satisfactory manner by Mr. Potter.

The lumber used by him was as follows: square timber for frame, mostly pine, obtained in Boxford, 18,000 feet. The scaffold beams, between the posts, are spruce; joists in the frame, 5,000 feet; hemlock boards, 13,000 feet; spruce for cattle and horse stalls, 2,000 feet; pine for finish, 2,500 feet; shingles, 27,000; spruce clapboards, rough, four feet long, 2,500; pine plank for flooring, 5,000 feet.

In addition to the contract price of eleven hundred and twenty-five dollars, the committee have paid Mr. Potter one hundred and twenty-five dollars and five cents, for removing and repairing a portion of the old barn, and altering the finish of the new one. They have also paid twenty dollars for a weather-vane; six dollars for drawing plans, etc.; and eight dollars for posts to cellar. There remains on hand of the thirteen hundred and twenty-seven dollars appropriated by the society, a balance of forty-two dollars and seventy cents. It is important that an open shed costing one hundred dollars, according to Mr. Potter's estimates, should be constructed running from the new barn to the removed portion of the old one; and the committee would recommend that an appropriation of fifty dollars be made for this purpose.

Geo. B. Loring, *Chairman.*

ESSAY ON SUCCESSFUL AGRICULTURE.

BY JABEZ FISHER.

"Muck is the mother of meal."

By the term successful agriculture, we do not wish to be understood to mean the success of the agriculturist. A successful farmer is supposed to be one, who, by and through the pursuit of his business, amasses wealth, adds to his acres, and prospers in a pecuniary sense. Successful agriculture, on the other hand, has no reference to extent of possessions, nor in any considerable degree to pecuniary results, but applies only to success in the tilling of a given quantity of land. It is proposed at the present time to direct attention mainly to one of the more important, in fact the most important one of the indispensable requisites for a high degree of success. Agriculture is the art of tilling the earth for the sake of the product resulting from that tillage. Tillage includes every operation which the farmer performs, from first to last, for the benefit of a growing crop. Preparation of the land, planting the seed, all of the after cultivation and the harvesting of the product, are covered and expressed by the term tillage.

Let us consider for a moment the particular motive that governs us in performing each of these operations. In the preparation of land for crops generally, draining is the first subject that occupies attention. If the water level reaches during the growing season so near to the surface as to interfere with the downward extension of the roots, then draining is demanded. If the crop be perennial, or biennial, then there should never, at any season of the year, be standing water found so near to the surface, as to submerge roots liable to be frozen. The object in ploughing is to kill vegetation, if the land be in sward, and to lighten and pulverize the soil, that tender roots and rootlets may readily penetrate it in search of nutriment for the growing plant. In the application of various manures, the expectation of the cultivator is that they will furnish food in addition to what previously existed in the soil, and he looks for an increased product in consequence. The subsequent operations of hoeing and cultivating are for the purpose of keeping down the growth of vegetation other than that for which the husbandman is laboring, in order that this extraneous vegetation may not deprive the planted crop of that nutriment provided and designed for its especial use and benefit.

We may now inquire what are the conditions of success in the highest degree, in the production of results flowing from each of these divisions or operations as applied to the cultivation of a crop on a given piece of land. If the surplus water has been removed by draining, and the ploughing in its depth and character promises to be the best for the proposed crop, then all is done that can be in that direction. This, however, may not be the best, looking beyond the present. The highest success is only attained, when the extreme productive capabilities of the soil are profitably reached. In order to ascertain what these are, it may be necessary to inquire what is the most valuable or profitable product which the particular piece of land under consideration is capable of furnishing. With this idea before us, we shall be more likely to succeed than if we looked at merely present results. As a general rule, land cannot be ploughed too deeply, if the whole soil inverted be of an even quality and homogeneous in its nature. Looking for the best results, it is well to deepen the ploughing a little each time, until the best depth is reached. Deep ploughing gives an increased range for the roots of plants, and the deeper the ploughing the greater the exemption from the evil effects of extremes of moisture and drought. The number of times which the ground should be moved previous to planting, depends upon various considerations. As a rule, it cannot be stirred, mixed and pulverized too much for the quantity or value of the crop, but may for its profit.

The time and manner of planting have an influence upon the crop but need not be noticed here. On the subject of after cultivation, there exists some difference of opinion. Many, and perhaps the majority, cultivate only to prevent the growth of weeds. A few, in order to stir the surface and prevent it from becoming hardened, and some for the purpose of hilling crops. The best result we think will be attained if we cultivate primarily to stir the surface, especially after heavy rains, and secondarily to suppress the growth of weeds, and but seldom or never for the purpose of hilling. Frequent stirring of the surface tends to promote the constant movement of moisture contained in the soil and thus brings the matters dissolved in it, within reach of the spongioles of the roots. A great deal of unprofitable labor may be expended in growing a crop, and every intelligent cultivator will use only just so much as will pay, but should be satisfied with nothing less.

On the points enumerated we think that the limit of success is very nearly reached by our best cultivators. Concerning one other, and by far the most important, it will be generally acknowledged that there is room for very great improvement. We allude to the subject of manuring, and what we shall have to say farther will be in relation to it. It is a well known fact that if we plant crops of any kind upon a soil year after year without addition of any kind, the product will constantly and rapidly diminish until in a short time it ceases to be remunerative. It has been found from the experience of all ages that the fertility of soil can only be kept up by the addition of sundry substances, to which collectively, the name manure has been given. Manure may be defined as any substance, the addition of which to the land tends to promote its fertility. Chemically, manures can be divided into two classes; one class including all those matters which plants take up as food directly, and the other, such as assist the plant indirectly in aid of its nourishment but do not act as food. The distinction perhaps is not as yet perfectly understood, but the first class includes all organized, vegetable substances in a peculiar condition of decay, generally known under the comprehensive term, humus or vegetable mould. The second class comprises such other substances as contribute in any way to the building up, or the perfecting of the structure of plants. Humus, in fact, is the pabulum from which vegetation is directly fed. Every soil capable of growing crops contains it. It may generally be known by the dark or black color which it gives to the upper layer of the soil. If we dig a hole in any cultivated field we shall find that this dark colored layer extends as deeply as the land has been lately ploughed. That portion of soil immediately underneath this layer is commonly of the same character as the upper layer itself, except that it is nearly destitute of this vegetable matter. Humus is a compound and very complex substance, made up of various acids and salts, all of which must be rendered soluble before being taken into the circulation of plants by absorption through the roots. It is probable that most of the alkaline substances used as manures, such as those consisting largely of potash, lime and ammonia, act mainly by rendering humus soluble, so that although not in themselves nutriment in the same sense in which humus is, yet by combining with insoluble humus compounds, they render them soluble, and then the new soluble compound becomes food. It is important to bear this distinction in mind, that, although all substances included under the general term manure contribute to promote fertility in the soil to which they are applied, yet humus acts directly and principally, while most others act mainly as adjuncts to that. For instance, the addition of soluble humus to a blowing sand, makes it at once capable of supporting vegetation, while without humus, none of the so called artificial manures would produce a like condition. Ashes would not cause a barren sand, free from humus to be fertile, neither would lime, or in fact any inorganic matter.

These statements may serve to explain some of the apparently contradictory results arising from the application of special manures. A farmer gives a piece of land a dressing of lime. The effect of lime is to render a portion of the humus in the soil, soluble, and vegetation appropriating it, a large crop is the result. Hence the inference, that lime is a valuable manure. He therefore repeats the application the following season, but neglects to use any humus producing materials in connection with it. The crop in this case falls short of his expectation. A third trial exhausts nearly all the humus in the soil, and the land becomes barren. Hence, lime exhausts the soil. If there had been applied the second season an amount of humus equivalent to the quantity appropriated by the first crop, there would have been little or no falling off in the product.

The practical view deducible from these considerations is, that humus, or vegetable matter, in a state or condition of decay, is the great want in the way of successful agriculture. Without humus, soil is absolutely barren. With an abundance of it, any crop may be grown by means of some of the artificial manures as additions. The soil of the Western prairies is made up, in great measure, of humus, the product of ages of decayed vegetation. A growing crop takes humus from the soil, but if allowed to mature and decay where it grows, there comes to be an absolute addition of humus to the soil, and the land becomes richer and capable of giving larger results. Where this action goes on from year to year and from century to century, as in the case of the prairies, the upper portion of the soil becomes in time little else than an immense bed of humus. Now if this natural action could be imitated by the farmer, it is evident that he would be increasing the productive capacity of his lands each year, and in time might be able to reach the limit of success. What, then, stands in the way of it?

The great objection which presents itself is, that it is through the sale and use of the various crops grown, the farmer thrives, and if he is to leave them to decay upon the land he must himself starve. Therefore he feeds a part of his crops to his animals, consumes a portion in his family, and disposes of the remainder in exchange for articles which he cannot produce.

In the general agriculture of the country, hay is the largest and most valuable product, and may be considered, in this connection, as a representative crop. A great portion of the hay grown is consumed on the farm or in the locality where produced. In the process of mastication the hay becomes finely divided, and after it has passed through the animal it is found to have lost a portion of its starch, albumen, &c., which have gone to assist in building up the structure of the animal or to supply its daily waste. That part which remains is the finely divided woody fibre of hay, mixed with some excrementitous matters. The great bulk of the food which has passed through the animal is still hay, but it is found to have assumed a state from which, in the presence of moisture and warmth, it soon passes into the condition of humus. It becomes humus much sooner under the same circumstances than undigested hay. The loss in its humus producing qualities is inconsiderable. If this substance which is known as stable or yard manure, be returned to the land, it will be nearly as valuable as if the original hay had remained and decayed on the land where it grew. Its bulk is unchanged, but the quality is just so far reduced as the animal has appropriated its nutritious constituents in adding to its structure, or in the production of fat or milk. In addition to this manure, a considerable proportion of that part of the food which goes to supply waste is eventually given off in the liquid excretion of the animal, and this liquid, when used in connection with the solid, is found to have a pecuniary value equal to or even exceeding it. It does not form humus in the course of its decomposition, but it produces ammonia, and this alkali combining with the humus of the solid manure renders it soluble, and as a consequence, at once available.

It is the experience of every careful and observing farmer, that, if the manurial product of an acre of grass be all saved and returned to the same acre, the productive power of the land will be increased thereby. It will be readily seen that this must be so, else every cultivated farm would long since have become barren, or rather, it would never have been otherwise. Were it not a wise provision of nature that vegetation takes from the soil, in the course of its formation, much less humus than its decay will furnish, this earth would have been forever a barren waste, without a green or living thing upon its face.

This survey of the subject seems to open up to our view the principal source from which success is attainable in the pursuit of agriculture. If we carefully save all the vegetable matter of our lands, and return it to the earth, either before or after being used for feeding purposes, our soil must necessarily increase in its capacity to produce crops; but if, on the other hand, by neglect, by wastefulness in any manner, or the indulgence of too great a greed for money to be obtained by selling hay or other products, without returning their equivalent in manure, by purchase or otherwise, we deprive our soils of this humus producing matter, they must necessarily run down and become less and less productive and valuable.

Let us look for a moment at the course pursued by a great majority of our farmers. Their hay and other forage is, perhaps, well fed, and produce an equivalent in manure. The solid portion is thrown out of the barn window to remain in a heap, exposed to the weather, until the annual or semi-annual clearing up. In the meantime the pile heats, and ammonia is formed, which, uniting with the humus of the manure, renders it soluble, and every rain that falls washes out a portion which either runs away, or is carried into the soil underneath. This action is repeated until a great portion of all that is valuable is completely lost. In addition to this, the liquid manure is allowed to run entirely to waste. That the action above mentioned does take place is shown by the effect produced by a heap of manure lying during one or two rains in a field which is to be planted. The manure may afterwards be completely removed from that spot, and two or three inches even of the soil itself carried off, and yet it will give a better crop than any other part of the field ; simply because of the soluble humus which has leached out of the heap into the underlying soil. The same action, precisely, takes place in the barnyard. The manure, in its progress towards decay, or the formation of humus, unites with the ammonia of the atmosphere, or that produced by the decomposition of the manure, and especially the liquid portion, becomes soluble, leaches into the ground and is lost. This is by far the most important source of waste, and we may consider how it shall be best avoided.

A plan which early suggested itself was to carry into the barnyard a quantity of absorbent material like straw, muck, loam, sawdust or other substance which would drink up and retain the soluble constituents of the manure. There is no doubt that these substances will have the effect designed, if a sufficient quantity be employed, but a layer of any one of them has only a definite capacity, precisely like a quart measure. After the measure is filled we may continue to pour liquid into it for any length of time without having more than a quart in the end. So with a layer of muck, or any other absorbent material, it will continue to drink in soluble humus until it can hold no more, after which, all that is poured upon it runs through unchanged. If enough of any of these materials could be furnished, all the manure might be thus saved, but this is probably never done. Aside from the difficulty, the expense necessarily incurred makes it a very unprofitable mode of proceeding. We contend that no man can afford to transport the soil of his farm to his barnyard, for the purpose of manuring it, and then back again. Even if he has a bed of muck to draw upon, which in itself is a mass of insoluble humus, needing but the addition of alkalies to neutralize the acids and render the humus soluble, we believe it to be of no advantage to place it in an open barnyard, for the reason that the humus of the muck, when made soluble by uniting with the ammonia of the manure, is itself leached out, instead of retaining that from the manure.

There are, it is believed, three ways in either of which nearly all the valuable constituents of the manure may be saved and made available.

First. It may be kept under cover from the time it is dropped until delivered upon the land. The only source of loss under this plan is by heating and consequent "fire fanging." If this takes place the substance is just as completely burned up as if fire had consumed it. This can be avoided by having sufficient space that the manure may be spread out in a thin layer and not allowed to remain in a heap, or by keeping swine upon it, or by keeping it sufficiently moist, without water in excess. If the humus becomes soluble under this treatment, there can be no great loss because there is no surplus water present to dissolve it out, and it will therefore be preserved until carried upon the land. The liquid manure in this case should be preserved separate, inasmuch as the solid manure cannot retain it all. Some dry substance such as muck may be used to absorb it, or it can be retained in a water-tight receptacle until needed for use.

Second. A water-tight cellar may be provided to contain both the liquid and solid portions of the manure together. There should be enough liquid present to keep the solid manure always saturated. This can be done by adding water if the urine is insufficient. In this condition there can be no fermentation of a destructive character, neither any washing out of soluble elements of the manure, and the whole is saved without loss or depreciation until carried out for use.

Third. A mode which is theoretically perhaps the best of all, would be to spread the manure, both liquid and solid, upon the land while fresh. In this case whatever soluble matter might exist at the time, or which was formed afterward, would be washed into the soil by rains and there retained in a perfectly distributed condition until appropriated by growing vegetation. The objections to this plan are the inconvenience of so applying manure generally, its impracticability during the growing seasons, and also while the ground is deeply covered with snow.

The second mode, above given, is the one which we adopted some eight years since, and increasing experience leads us to the belief that, all things considered, it is the best. By this arrangement there seems to be absolutely no loss at all, and the liquid portion is at all times available, and the solid at any time after the liquid is all removed, which is readily accomplished by a chain pump of large calibre.

In this article it has not been our intention to do more than to bring into prominent notice the great want of our soils and the means of furnishing it. We cannot expect our farms to feed us unless we take care to feed them. There is too great a disposition at the present time to run after foreign fertilizers at high cost, under the delusive impression that in them is to be found a sovereign panacea for all the deficiencies of worn out soils. We are of the opinion that no man can be justified in resorting to such agents until he has taken means to make the most of the materials within his reach at home. Why go to Peru for ammonia to render his humus soluble, without first taking steps to increase his stock of humus? All these concentrated or artificial fertilizers are important adjuncts, but for every one used, we should remember to apply an equivalent of humus producing material. Then we may expect an increase of our crops without a corresponding depreciation of the condition of our lands. Then shall we be tending toward that condition to which our attention has been directed, denominated Successful Agriculture.

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